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## CONTENTS



### Jubilee of the Mersey Railway

AS long ago as March 1, 1825, a newspaper paragraph recorded "it is in contemplation to form a ground tunnel under the Mersey . . . the subject is under consideration by the Committee of the Birmingham Railway." Of course this early scheme was not realised, but its existence shows clearly that the advantages of such a means of communication were many and strong. Actually the Mersey Railway, which now attains its jubilee, as it was formally opened by the Prince of Wales (afterwards King Edward VII) on January 20, 1886, was the outcome of a scheme taken in hand in December, 1865, by an important committee of local civic officers and leaders of commerce. The proposal was for a pneumatic railway in which trains would fit the tunnel like a piston in a cylinder. Sir Charles Fox was responsible for the technical arrangements, and Parliament sanctioned the scheme by incorporating the Mersey Pneumatic Railway Company on June 28, 1866. After much careful consideration it was decided eventually to rely on a tried system of motive power; the name was changed to the Mersey Railway Company on July 31, 1868; and 11 years afterwards experimental boring began. Following the formal opening already referred to, public traffic with steam traction started on February 1, 1886. The railway was not a financial success and more satisfactory motive power for tunnel working was at last found in electricity. Under authority of an Act of 1900 the line was electrified, and was the first English steam line to be so converted. The change-over took place on May 3, 1903, following equipment by the British Westinghouse Electric & Manufacturing Co. Ltd., and the advantages of electric traction for this type of service have since been outstandingly exemplified by an increase in passengers from 6,650,000 in 1902 to about 17½ million in 1934; against a deficit of £4,086 in 1902, the 1934 working resulted in a revenue surplus of £90,549.

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### The Railway Electrical Engineer

Under the title, "The Varied Responsibilities of a Railway Electrical Engineer," there will be found, on page 104 of this issue, the first part of an unusual article describing the experiences of a well known electrical engineer, who recently retired from the service of the L.M.S.R. Its interest centres mainly in two facts, (1) that his service embraced the whole period of railway electrical development from very small beginnings down to the present day, when everything—except signalling, telegraphs, telephones, &c.—that can be operated both economically and conveniently by electricity is under the jurisdiction of the electrical engineer; and (2) that the article covers a remarkably wide range of activities, varying from traction to workshop equipment, from road vehicle maintenance to track water trough control and pumps, from hotel lifts to hydraulic plant conversions, from power house boilers and machinery to capstans and cranes in goods depots and on quays, and from coaling plants to steamship equipment. The narrative is, moreover, reinforced by anecdotes describing emergency measures taken in varying crises, and by the recounting of how motors and other plant were adapted by the railway staff for specific or novel duties.

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### The Week's Traffics

Coal accounts for £55,000 of the increase of £97,000 shown in the traffics of the four group railways for the past week. Goods traffic gains amount to £32,000 and those of passenger trains to £10,000 only. For the two weeks of the current year the total receipts of the four companies amount to £5,274,000, an increase of £209,000 or 4·13 per cent. Passenger train earnings aggregate £2,047,000, an advance of £41,000 or 2·04 per cent., and the merchandise receipts of £1,869,500 show a net increase of £41,000 or 2·24 per cent., whereas the coal class traffics are £1,357,500, representing a gain of £127,000 or 10·32 per cent. Competition of postal parcels has affected passenger train takings, and uncertainty as to the labour position is swelling coal traffics.

| | 2nd Week | | | | Year to date | |
|---|---|---|---|---|---|---|
| | Pass., &c. | Goods, &c. | Coal, &c. | Total | Inc. or Dec. | |
| | £ | £ | £ | £ | £ | % |
| L.M.S.R. .. | + 3,000 | + 23,000 | + 26,000 | + 52,000 | + 107 000 | + 5·29 |
| L.N.E.R .. | + 8,000 | + 12,000 | + 16,000 | + 36,000 | + 66,000 | + 4·31 |
| G.W.R... .. | — 3,000 | — | + 9,000 | + 6,000 | + 23,000 | + 2·65 |
| S.R. .. .. | + 2,000 | — 3,000 | + 4,000 | + 3,000 | + 13,000 | + 2·02 |

London Transport receipts for the past week amounted to £553,000, an increase of £26,800.

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### Rohilkund & Kumaon Railway

A decline of Rs. 32,143 in net earnings is shown in the report for the year ended September 30, 1935, as a drop of Rs. 5,733 in gross receipts was accompanied by a rise of Rs. 26,410 in working expenses. The Rohilkund & Kumaon Railway Company works the Lucknow-Bareilly State line in addition to its own, and its share of the net earnings for the year under review amounted to Rs. 16,94,307 against Rs. 17,50,619 for the previous year, producing, with gain in remittance and other items, £136,792 against £141,256. Stockholders will receive 16

per cent. per annum by way of dividend and bonus, the same as for the previous year.

| | 1934–35 | 1933–34 |
|---|---|---|
| Mean mileage .. .. .. | 574 | 573 |
| Passengers .. .. .. | 6,602,434 | 6,641,966 |
| General merchandise, tons .. | 1,211,053 | 1,185,920 |
| Train-miles .. .. .. | 950,880 | 894,810 |
| Operating ratio, per cent. .. | 45·93 | 45·51 |
| | Rs. | Rs. |
| Coaching receipts .. .. | 26,94,378 | 27,05,238 |
| Goods traffic receipts.. .. | 39,44,343 | 39,28,207 |
| Total earnings .. .. | 68,53,745 | 68,59,478 |
| Working expenses .. .. | 31,47,904 | 31,21,494 |
| Net earnings .. .. .. | 37,05,841 | 37,37,984 |

Though passenger numbers fell off, passenger receipts increased by Rs. 4,716, but parcels and miscellaneous brought in Rs. 15,576 less. In goods traffic the principal increases were in sugar and railway materials. Maintenance cost Rs. 84,564 more, and locomotive expenses were up Rs. 13,578.

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## Overseas Railway Traffics

The Canadian Pacific has begun the New Year well with an increase in gross earnings of £33,800 for the first week. It finished the old year with a gain of £827,200 in gross receipts, but judging by the results in November the previous decrease of £424,000 in net earnings is not likely to be reduced much. Amongst Argentine railways the best showing during the past fortnight has been made by the Buenos Ayres & Pacific which has added £35,955 in that period to its previous increase and is now making a further payment on account of arrears of debenture interest. The Central Argentine has at the same time added £17,907 to its previous increase.

| | No. of Week | Weekly Traffics | Inc. or Decrease | Aggregate Traffic | Inc. or Decrease |
|---|---|---|---|---|---|
| | | £ | £ | £ | £ |
| Buenos Ayres & Pacific .. | 28th | 86,075 | + 15,652 | 2,116,083 | + 191,992 |
| Buenos Ayres Great Southern .. | 28th | 131,962 | — 35,409 | 3,382,334 | — 111,727 |
| Buenos Ayres Western .. .. | 28th | 49,765 | + 6,338 | 1,166,895 | + 836 |
| Central Argentine .. .. | 28th | 129,166 | + 1,496 | 3,300,715 | + 79,587 |
| Canadian Pacific .. .. | 1st | 403,200 | + 33,800 | — | — |
| Bombay, Baroda & Central India | 39th | 256,200 | — 23,475 | 5,954,025 | — 19,875 |

By securing an advance of £12,014 in the two weeks, the Buenos Ayres Western has converted its previous decrease of £11,178 into an increase of £836. The Buenos Ayres Great Southern has been unfortunate in adding £58,953 to its previous decrease.

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## The Great Western Accident

A remarkable freedom from accident has characterised the Great Western Railway for very many years, in fact the last accident on that system sufficiently serious to be recorded by the "Universal Directory of Railway Officials and Railway Year Book," was the derailment at Lougher on October 3, 1904, in which three persons lost their lives. There have been two less serious accidents subsequently, in each of which one person was killed, namely those at Warminster in 1916 and at New Tredegar in 1928. On certain of the smaller lines incorporated in the Great Western Railway at the time of amalgamation accidents have occurred, though very few, but no other railway system in the country bears such a remarkable record for the safety of its passengers as the Great Western. The fact that the Great Western is the pioneer of high speed passenger services in this country, and that for years it has operated the fastest regular start-to-stop run—that of the Cheltenham Flyer booked at an average of 71·4 m.p.h. between Swindon and Paddington—makes this safety record all the more creditable. The cause of the unfortunate accident last Wednesday near Shrivenham is, of course, the subject of a Ministry of Transport inquiry and cannot therefore profitably be commented upon at the present time. Attention may be drawn, however, to one feature, namely, the remarkable strength imparted to the timber framed bodies of modern British semi-steel stock by the outside steel panelling. The heavy steel underframes of the vehicles no doubt also contributed to minimise telescoping and wreckage.

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## The G.C.R. and Stratford-on-Avon

The coming withdrawal, announced on page 126, of the daily through carriage in each direction between Marylebone, L.N.E.R., and Stratford-on-Avon, means the end not only of slip coaches on the G.C. section, but of a service which at one period offered some highly competitive timings. Stratford is one of the few towns to which the former Great Central Railway could claim a shorter route from London than any other company. It is 89½ miles from Marylebone via Aylesbury, Woodford, and the Stratford-on-Avon and Midland Junction Railway (now L.M.S.R.), compared with 102¾ miles from Paddington via Bicester and Hatton, or, when the G.C.R. through services were introduced in the summer of 1902, with the then shortest Great Western route of 110¾ miles via Oxford and Honeybourne. Starting with a daily through coach each way and a best time of 2 hr. 20 min., the Great Central was able to announce that it had the fastest London-Stratford service. In July, 1904, another through carriage was added in both directions and acceleration gave one booking of 2 hr. 5 min. from Stratford to London. This equals the fastest time in the current G.W.R. services. Although slightly below the best for the route, the present 2 hr. 17 min. of the through carriage on the 6.20 p.m. from Marylebone (which adds 4½ miles to the journey by travelling via High Wycombe) is well up to the average of London-Stratford timings by either company.

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## Fewer Engines, Higher Power

The fact that the 48,304 locomotives in service on the Class I railways of the U.S.A. at the end of 1934 represented a decrease of 17,054 compared with 1924, from which year the falling off in numbers has been progressive, does not imply a proportionate or continuous decline of traffic movement. It is only since 1929 that this factor has been important, by which time the policy of more intensive use of more powerful engines was already well developed. From 1924, when locomotive stock reached the peak total of 65,358, until 1928, during which period the volume of traffic was fairly constant, the number of engines in service was reduced by 5,888, or 8 per cent., while the average tractive effort of locomotives rose from 39,891 lb. to 43,838 lb., or 9·1 per cent. Since 1928, the number of engines had been reduced at the end of 1934 by a further 0·2 per cent., and a similar percentage increase had taken place in average tractive effort, which then stood at 47,712 lb. Increases in power, like reductions in numbers, have been recorded year by year from 1924, the most pronounced advance in this period being one of 1,200 lb. between 1925 and 1926. The total increase from the average of 33,188 lb. in 1916 to the 1934 figure is one of 44 per cent.

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## Insufficient Information

When railway services are disorganised by fog, as they almost inevitably must be to some extent, the reasonable traveller does not complain at not finding things as convenient as usual. Nevertheless when it is announced that "every effort will be made to run trains as required by the traffic," he has cause to complain when guidance in regard to special fog services is denied him. A corre-

spondent, who is a regular traveller on one of the London suburban lines, has had several unfortunate experiences lately in foggy weather, and writes to us of what he regards as " slackness and indifference on the part of the staff." He has found that the specially advertised fog services more often than not run at times very different from those advertised for them, thus causing the traveller to waste much time waiting at the stations and making it uncertain when he can complete his journey. Another point that impressed him was the inconsistent labelling of the trains, many of which were devoid of destination boards, and whose destination was not announced by the station staff. Nor were any train departure indicators provided on the platforms as a substitute. These details he considers could easily and should quickly be remedied, and, while we sympathise with the railway authorities when they are grappling with the difficult conditions of a train service unavoidably thrown out of gear by causes beyond their control, we confess that the cause of our correspondent's particular complaints does appear to be remediable without much difficulty.

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### Glasgow Subway Signalling

The adoption of electric traction on the Glasgow Subway has necessitated the reconstruction of the signalling. As steel sleepers have been laid down at intervals to facilitate the support of the conductor rail, track circuits were not practicable, and, as mentioned in our *Electric Railway Traction Supplement* for December 13, 1935, special control circuits were devised for the new automatic signals and train stops, comprising an entering section rail treadle and relays actuated by the passage of the lighting supply shoes along the wires on the tunnel walls. Station indicators showing the approach of trains have also been provided. The original signalling adopted when the line was opened with cable haulage in January, 1897, was the semi-automatic block of Saxby & Farmer. There was a " somersault " semaphore starting signal at each station fitted with a Hodgson electric slot or reverser, combined with a treadle and a semaphore type block indicator. If the last named showed " clear," the slot was energised and the signal could be lowered by the station official, who was provided with a hooked stick for the purpose, pulling on an operating chain depending from the roof of the station but out of reach of the public. When a train left a station it actuated the treadle, discharging the slot and putting the starting signal to danger. At the same time the relative block indicator was put to clear at the station in the rear, and a bell rang, energising the slot there and allowing the signal to be pulled off again for a following train.

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### Collieries and Railways

In his informative paper to the Institute of Transport last Monday, reported on another page, Mr. J. C. L. Train referred to the dual part played by colliery subsidences in railway working. The extraction of coal, which is the cause of these subsidences, brings an enormous revenue to railway companies, but on the other hand it is responsible for considerable interruption of traffic. Mr. Train explained the position of the railway companies in relation to the colliery companies when the working of coal measures under railways is proposed. The only means the railways have of avoiding the almost inevitable caving in of the ground carrying their lines over such workings is to prevent the excavation of coal under them by compensating the colliery company concerned. Subsidences of the land over colliery workings in Germany are prevented by filling up the workings with slag or spoil. This procedure is compulsory by law and has the double advantage of preventing a drop in the level of the land in one place and the raising of it in unsightly slag heaps in others. The measure was adopted some years ago to avoid the risk of flooding and diverting the courses of important waterways over coalfields.

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### Comparative Costs of Steam Locomotive Repairs

Towards the end of last year a report dealing with the comparative costs of steam locomotive repairs was submitted to the President of the Association of American Railroads, this report being based upon a series of close investigations, carried out by Mr. Eastman, of the conditions appertaining to fifteen different railways. The calculations included about 40,000 locomotives, representing 116,079 locomotive years; more than 3,200 million locomotive miles, and nearly 619-million horsepower units. The repair costs amounted to more than 707 million dollars. The study was based on a period of three years, and included a large number of points of reference, among them being shop management; adequacy of shop running and shed facilities; shop practices; water supply and treatment; the design of the engines and tenders; the influence of speed upon repair costs; cost of maintaining locomotive cab signals and train control fittings, and that of maintaining special devices. In addition, fuel handling methods, distributing and accounting, and the proportion of total locomotive fuel consumed under varying conditions, were investigated. It was found impossible to analyse the above factors fully, and as the study progressed it became evident that numerous statistical measures could not be used in the customary manner for making comparisons or drawing conclusions. It was, however, found possible to arrive at certain definite conclusions on which recommendations to the Association of American Railroads could be made in the report.

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### Some Conclusions and Recommendations

Mr. Eastman's report contained a brief outline of the study made of the data submitted by the fifteen selected railways, and the conclusions arrived at were that nearly $750,000 a day are being expended by American transport bodies for the servicing of steam locomotives. There was some disparity between the labour and other costs on the Eastern as compared with the Western railways, and the fact that labour costs amounted to two-thirds of the total costs of locomotive repairs explained 7·9 per cent. of the 40 per cent. higher repair costs for the Eastern group during the three years covered by the investigation. The load factor or utilised proportion of an engine's potential horsepower, as measured by fuel consumption, was 13·5 per cent. greater in the Eastern than in the Western group, which justified the much increased cost, other factors remaining the same. The average length of locomotive runs between repairs was shorter in the Eastern than in the other group, an important factor which would account for the increased cost of repairs in the first named group. It was recommended that a committee of experts, preferably nine in number, representing the railways, the locomotive builders and the Federal Government, be appointed to make an early report upon the kind of information needed, the manner in which it should be kept, and the way in which it should be used with respect to fuel economy, locomotive utilisation, and the economic life of steam locomotives. A further recommendation was that in addition to investigating the detail methods used by American railways, the committee should make a careful examination of the practices in vogue on at least the Canadian and English railways, where, it was stated, the subject had already been given much attention.

## South African Railways and Harbours

A FURTHER proof of the sound financial position of the Union of South Africa Railways and Harbours is afforded by the report for the year ended March 31, 1935, which we have received from Mr. T. H. Watermeyer, the General Manager. The report is full of interest as it gives both in broad lines and in detail the general policy of advancement adopted, shows in diagram deviation and line improvements and the electrification plan for the Johannesburg area, and illustrates photographically new types of locomotives and rolling stock, and various works. There is also an excellent map showing the South African and neighbouring railways. As a consequence of the favourable conditions, the final result of the year's working of all services—railways (main and subsidiary services), harbours, steamships, and airways—was a surplus of £2,547,701, after making allowance for all outgoings and special contributions, compared with a surplus of £1,523,807 for the previous year. The present surplus enables the accumulated deficits (£2,168,270) of the years of depression to be wiped out, leaving a net surplus of £379,431. Railway traffic increased during the year under review to a phenomenal extent; the tonnage conveyed, passengers carried and revenue earned were the highest on record. Compared with the pre-depression year 1929-30, the earnings of the main services in 1934-35 were higher by £558,573 or 1·88 per cent. Some figures relating to railway transportation services are compared with those of 1933-34 in the accompanying table. The final surplus is arrived at after allowing for receipts and outgoings in respect of subsidiary services, *i.e.*, road motors, catering and bedding, bookstalls and advertising, and for interest charges. There was a reduction in interest charges from £5,337,838 to £5,161,420 owing to adjustments with the Treasury.

| | 1934–35 | 1933–34 |
|---|---|---|
| Passenger journeys | 83,280,993 | 75,757,764 |
| Goods and minerals, tons | 15,371,406 | 13,195,413 |
| Coal traffic, tons | 8,414,170 | 7,228,082 |
| Ton-miles (revenue earning) | 4,983,424,478 | 4,142,917,964 |
| Average haul, miles | 207 | 198 |
| Route miles open | 13,225 | 13,180 |
| Train-miles | 46,713,496 | 43,653,289 |
| Operating ratio, per cent. | 67·88 | 71·37 |
| | £ | £ |
| Capital expenditure (open lines) | 149,871,077 | 148,758,522 |
| Passenger receipts | 4,907,899 | 4,532,651 |
| Goods and mineral receipts (other than coal) | 16,664,473 | 13,985,115 |
| Coal traffic receipts | 3,328,521 | 2,965,476 |
| Total earnings | 27,021,815 | 23,707,524 |
| Gross working expenditure (including depreciation) | 18,341,222 | 16,919,521 |
| Surplus over expenditure | 8,680,593 | 6,788,003 |
| Final surplus | 3,888,725 | 1,813,506 |

On harbours there was a net surplus of £307,357, and on steamships one of £1,756, but on airways there was a deficit of £33,493. The contribution to betterment fund was £550,000, and to reduction of deficiency in pension and superannuation funds £287,000. There was also a special contribution of £100,000 to renewals fund for rolling stock depreciation and a special appropriation of £679,644 for writing dead assets out of capital account (harbours). Road services showed a clear profit of £59,157, and bookstalls and advertising one of £18,815, but on catering and bedding there was a loss of £17,752 notwithstanding the much larger turnover. Much of the heavy volume of traffic dealt with during the year under review was represented by mining material and supplies; building activity along the Witwatersrand Reef was intensive, and industrial activity generally showed marked expansion. Import and export trade reached satisfactory levels, and, with the termination of the drought period, there was substantial improvement in agricultural production. The number of passengers carried exceeded by 1,286,476 the previous highest total, which was in 1928-29, and, collectively, the tonnage of goods and coal traffic was higher by 1,270,610 tons than the previous highest tonnage which was recorded in 1929-30. Earnings from all classes of traffic increased by 13·98 per cent. in comparison with 1933-34 and eclipsed the previous record set up in 1929-30 by £891,266. Receipts from passengers increased by 8·28 per cent., from parcels by 8·30 per cent., from goods and minerals (other than coal) by 19·16 per cent., and from coal by 12·24 per cent. in comparison with 1933-34.

Ordinary working expenditure, exclusive of contributions to the renewals fund, increased by £1,187,861 or 7·85 per cent., and gross working expenditure by £1,421,701 or 8·40 per cent. Salaries, wages, and travelling expenses increased by £1,282,915 or 10·32 per cent., partly caused by overtime and Sunday time payments due to heavy expansion of traffic which involved the adoption of special measures to expedite the handling of goods and so to procure quicker turn-round of truckage, and partly to the restoration of staff conditions existing before the depression. The depression left the administration with an insufficiency of trained staff. In maintenance of permanent way and works there was an increase in cost of £162,531 or 6·98 per cent., due mainly to overtaking arrears accrued during the depression period. Rolling stock maintenance involved an increase of £445,472 or 13·97 per cent., mainly due to more repair work. Though running expenses advanced by £286,188, or 6·65 per cent., costs per train-mile and engine-mile were slightly lower. Traffic expenses were higher by £287,612 or 7·97 per cent., mainly due to the larger volume handled.

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## Insurance of Livestock

AMONG the many facilities which the railway companies have introduced during the last two years for the purpose of assisting traders, is that of the insurance of livestock. Under the standard terms and conditions of conveyance of livestock by freight or passenger train services, as settled by the Railway Rates Tribunal, the liability of the railway companies for loss of, or injury to, animals during transit is limited to certain specified amounts which vary according to the class of animals concerned. Senders of livestock are entitled, however, to declare higher values in writing at the time the animals are handed to the railway and, upon payment of a premium upon the excess value, the liability of the companies is enlarged correspondingly, but in any case, the statutory conditions of carriage relieve the companies from liability for loss, delay, or injury in certain well-defined eventualities. For the purpose of assisting senders of livestock to obtain greater protection against the possibility of loss or injury to animals in transit, a scheme was introduced experimentally in November, 1933, after consultation with the National Farmers' Union, whereby senders could insure animals conveyed at goods train rates by rail and/or road services by the prepayment of a very small premium. The scheme, which embraced cattle, calves, sheep, lambs, and pigs, at once proved attractive to traders and over one million animals were insured during the first twelve months.

The initial year's working revealed, however, that the premiums had been fixed on too favourable a basis and, as from November, 1934, certain adjustments were made in the premiums charged on all animals except cattle. In January, 1935, to meet representations from traders, horses and ponies were included in the scheme and on

July 1, 1935 a similar arrangement was adopted experimentally in respect of livestock forwarded by passenger train or other similar service and/or railway-owned road vehicles used for the transport of passenger-rated livestock. In the case of passenger train traffic, however, the animals can be insured for considerably higher values than they can by goods train services. During the second year's operation of the goods train scheme, the facility proved increasingly popular, and it is being continued for a further year, but with slightly increased premiums for sheep, lambs, and pigs, as experience has shown that those charged previously were too low. The popularity of the facility is not surprising having regard to the very modest premiums charged, which range from one penny a head for sheep and lambs with a maximum insurable value of £3 a head, to eightpence per head for horses and ponies with a maximum insurable value of £50 a head, in the case of goods train traffic. Further, to meet the requirements of a large number of traders who desire regularly to insure all, or a specific proportion of their livestock during transit, arrangements have been made for the prepayment requirement to be waived upon receipt of a suitable undertaking and for the charges to be debited against the trader's credit account. By this means the railways are seeking to make their livestock services as comprehensive as possible in character for the purpose of meeting the requirements of modern trading conditions.

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## Earnings of American High-Speed Trains

PUBLIC response to the inducement of high-speed railway travel in America has been referred to editorially in our issues of August 9, October 18, and November 22, 1935. A more detailed economic survey of the revenues and expenses of the accelerated trains has now been completed, and its results, recently published in the *Railway Age*, are particularly interesting in the comparisons afforded between the three Chicago-Twin Cities routes competing in this field. The period covered is June-July, 1935, and this is a time of year at which the counter-attractions of private motorcar or omnibus travel on the fine highways existing between these points, or of air travel on the well established routes competing with the railways, may be expected to be high. Another point to be borne in mind is that the high-speed trains are additional to the normal services, which in themselves provide four northbound and five southbound trains daily between Chicago and St. Paul on the C. & N.W., and the C.M.St.P. & P., and four each way on the C.B. & Q. Two other railways, the Chicago Great Western and the Minneapolis, St. Paul and Sault Ste. Marie (controlled by the C.P.R.), furnish one daily through train in both directions.

In net revenues for the two months, the order of results places the Hiawatha of the C.M.St.P. & P. first with $127,296, the C.B. & Q. Zephyrs second with $76,195 (these units give two services daily in each direction), and the "400" of the C. & N.W. third with $33,198. The lead of the Hiawatha may be partly explained by the attractions of its new-style rolling stock, with its tasteful decoration, adjustable seating, wide gangways, and smoking lounges. A still more important factor is the publicity the train has received, not only from planned advertising, but from the interest it has itself created by its completely streamlined form, which is made more striking by the adoption of an arresting yellow colour for engine and coaches. The "400," on the other hand, is composed of standard coaches, with modernised interior decoration. The Zephyrs are, of course, also air-conditioned, but cater only for light refreshments. Both trains are, of course, completely air-conditioned, and so provide for the passenger as clean travel as any electric or diesel train, and both have full restaurant accommodation. It is somewhat significant that the "400's" average patronage of 160 passengers per trip (in a total seating capacity for 268) fell off to 128 after the rival services were introduced. The latter figure prevailed during the economic study now under review, and over the same period the Hiawatha was carrying an average of 290 passengers. Those who maintain that it is an extravagance to go to the trouble and expense of streamlining steam trains might ponder upon the outstanding popularity and success of the streamlined Hiawatha, which are further confirmed by the following figures of revenues and running expenses. The Hiawatha showed little more than the "400" in running expenses, its figure of $1·189 per train-mile comparing with $1·151 for the "400." Net revenue per train-mile was $2·47 on the Hiawatha, and $0·65 on the "400." The corresponding figure for the Zephyrs of the Burlington route was $0·726; these units have a seating capacity of only 86, and took on an average $1·178 per train-mile as against $3·659 on the Hiawatha and $1·8 on the "400." In running expenses, the Zephyrs averaged $0·452 per train-mile. As a final indication of the traffic-creating propensities of high-speed trains, it is useful to examine a case where such a service has replaced earlier facilities. An instance is provided by the original Burlington Zephyr on the run from Lincoln to Kansas City. Between these points the diesel unit, making one trip each way daily, has carried 204 passengers a day during its first year of operation, a 50 per cent. increase over steam haulage.

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## The Broad Gauge in Germany

THE little Nuremberg-Fürth Railway was built to the standard 4 ft. 8½ in. (or Stephenson's) gauge, and it is to the credit of most of those who promoted further lines in Germany, necessarily isolated at first, that they adhered to this plan and so saved the country from the confusion which cost others so dear later on, and still persists in some of them. There was, however, one important exception, for the Grand Duchy of Baden adopted a gauge of approximately 5 ft. 3 in. One of the earliest advocates of railways in Baden was a merchant of Mannheim, L. Newhouse—presumably of English descent—who proposed that the Government should sanction a line from that city to the Swiss frontier near Basle. Friedrich List and C. F. Nebenius were also active in this direction later. Nothing much was done until Baden began to fear railway competition from the other bank of the Rhine. That State then decided to make the line and sent a commission to study railways in England, France, and Belgium; the broad gauge was adopted on its recommendation. Trains began to run from Mannheim to Heidelberg in 1840, and to Karlsruhe in 1843, but did not reach the frontier till some years later. The Zurich Northern Company made part of its line in Switzerland to the Baden gauge, converting it on amalgamating with the Swiss Eastern, but nobody else adopted it. Both the German Railway Association and the Swiss Confederation officially declared for standard gauge, leaving Baden isolated. The resulting inconvenience, which had been felt almost from the beginning, became more and more acute, and in 1854 heavy track and rolling stock renewals and widened lines became imperative, opportunity was taken to convert the gauge with the least possible cost. On April 15, 1855, the last broad gauge section disappeared.

# LETTERS TO THE EDITOR

*(The Editor is not responsible for the opinions of correspondents)*

## Railway Statistics of Operation

York, January 11

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I have been much interested in the article on the above subject by "A Railway Correspondent" on pages 964 to 967 of your issue of December 6. I should be glad to know why he makes no reference to one important figure, viz.: train-miles per freight engine-hour, because his Item No. 4, train-miles per train engine-hour takes no account of the time spent in marshalling yards, which vitally affects journey time. I know that when the present system of statistics was copied from America in 1902 by the North Eastern Railway, the figure of freight train miles per freight engine-hour was considered the only real test of the rapidity of the service given to traders.

Perhaps your correspondent will be so kind as to let your readers know what he has to say on the points I have raised, for the subject is not only very interesting to many of your readers, but very important for the welfare of trade.

Yours faithfully,

H. A. WATSON

[We submitted a proof of the above to our contributor, who replies as under: "Mr. Watson is of the opinion that 'train-miles per freight engine-hour' is a better criterion of transit time than 'train-miles per train-hour,' because the former includes time spent in marshalling yards, whilst the latter does not. This, of course, is true, but, as clearly stated in the article, this item was intended to demonstrate the speed of freight train movement, which it does much more accurately than 'train-miles per engine-hour,' which includes the total time occupied by the locomotive from engine shed at commencement to engine shed at conclusion of the trip, often a material factor. But, in point of fact, the feature which Mr. Watson stresses has been fully brought out in the tables, because the products of the train hour, viz., wagon miles and net ton miles (Items Nos. 3 and 5 in the tables) have in each case been used in relation to engine-*hours*. Traders and railway officers alike may surely find some satisfaction from the fact that in respect of both these statistical units of measurement the British railways established high records during the year under review (1934)."—ED., *R.G.*]

## Fourth Class

7B, Hay Lane, Kingsbury,
London, N.W.9, January 13

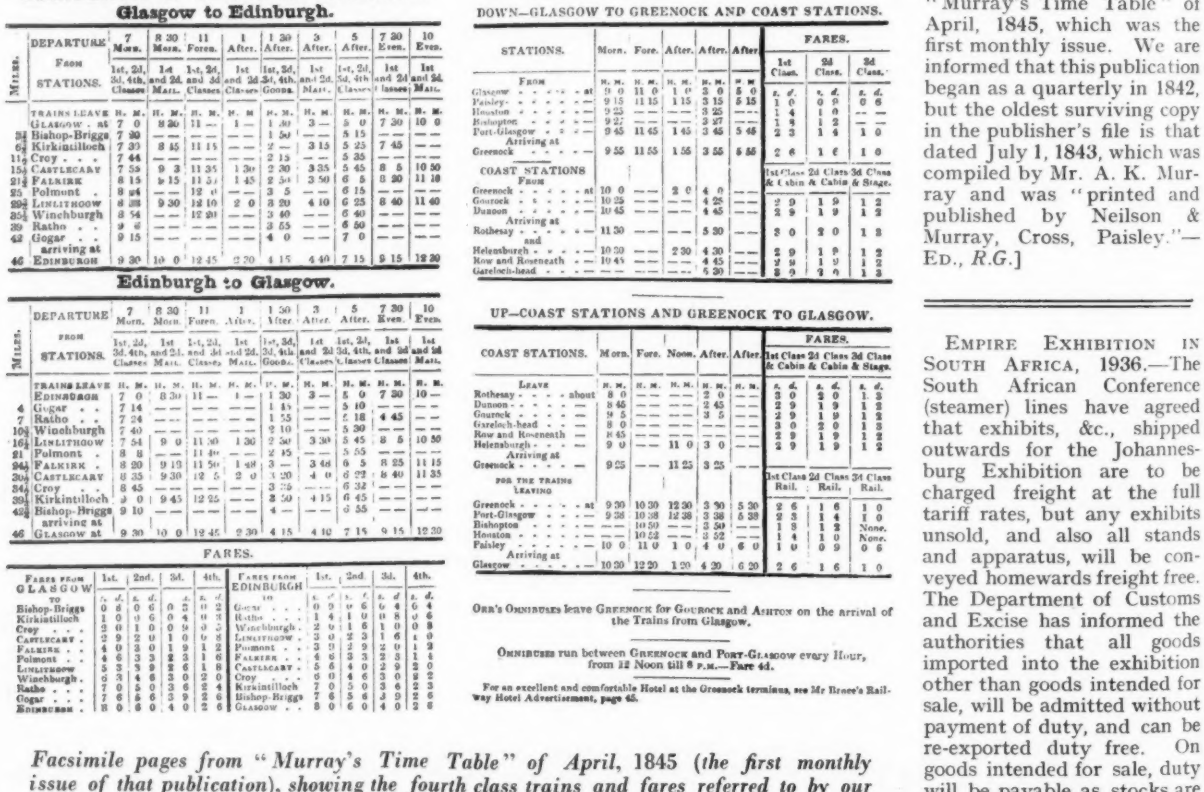
TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Shortly after sending you my letter on "Fourth Class," which I see you have been good enough to insert in THE RAILWAY GAZETTE of December 27, Thomas Murray & Co., the publishers of Murray's Timetables for Scotland sent me a reproduction of two pages of the monthly issue of April, 1845. I see from these that the Edinburgh-Glasgow Railway shows three trains each way with a "4th class"—one being "goods" as well,—and also that the table of fares gives 4th class, which work out from Edinburgh to Glasgow (46 miles, 2s. 6d.) at under three farthings a mile. I have never seen the 4th class set out so fully in time and fare tables before.

Yours faithfully,

REGINALD B. FELLOWS

[Through the courtesy of Thomas Murray & Co. Ltd. of Glasgow, we are able to reproduce the two pages (actual size) to which our correspondent refers. These are from "Murray's Time Table" of April, 1845, which was the first monthly issue. We are informed that this publication began as a quarterly in 1842, but the oldest surviving copy in the publisher's file is that dated July 1, 1843, which was compiled by Mr. A. K. Murray and was "printed and published by Neilson & Murray, Cross, Paisley."—ED., *R.G.*]



**EDINBURGH & GLASGOW RAILWAY.**

**Glasgow to Edinburgh.**

| Miles. | DEPARTURE FROM STATIONS. | 7 Morn. 1st, 2d, 3d, 4th, Classes | 8 30 Morn. 1st and 2d, Mail. | 11 Foren. 1st, 2d, and 3d Classes | 1 After. 1st and 2d Classes | 1 30 After. 1st, 3d, 4th, Goods. | 3 After. 1st and 2d, Mail. | 5 After. 1st, 2d, 3d, 4th Classes | 7 30 Even. 1st and 2d and 3d Classes | 10 Even. 1st and 2d Mail. |
|---|---|---|---|---|---|---|---|---|---|---|
| | TRAINS LEAVE | H. M. | H. M. | H. M. | H. M. | H. M. | H. M. | H. M. | H. M. | H. M. |
| | GLASGOW . at | 7 0 | 8 30 | 11 — | 1 — | 1 30 | 3 — | 5 0 | 7 30 | 10 0 |
| 3¼ | Bishop-Brigg | 7 20 | — — | — — | — — | 1 50 | — — | 5 15 | — — | — — |
| 6¼ | Kirkintilloch | 7 30 | 8 45 | 11 15 | — — | 2 — | 3 15 | 5 25 | 7 45 | — — |
| 11¼ | Croy . . . | 7 44 | — — | — — | — — | 2 15 | — — | 5 35 | — — | — — |
| 15½ | CASTLECARY | 7 58 | 9 2 | 11 35 | 1 30 | 2 30 | 3 35 | 5 45 | 8 5 | 10 50 |
| 21½ | FALKIRK . | 8 15 | 9 15 | 11 55 | 1 45 | 2 50 | 3 50 | 6 5 | 8 20 | 11 10 |
| 25 | Polmont . | 8 24 | — — | 12 6 | — — | 3 5 | — — | 6 15 | — — | — — |
| 29½ | LINLITHGOW | 8 33 | 9 30 | 12 16 | 2 0 | 3 20 | 4 10 | 6 25 | 8 40 | 11 40 |
| 35½ | Winchburgh | 8 54 | — — | 12 20 | — — | 3 40 | — — | 6 40 | — — | — — |
| 39 | Ratho . . | 9 6 | — — | — — | — — | 3 55 | — — | 6 50 | — — | — — |
| 42 | Gogar . . | 9 15 | — — | — — | — — | 4 0 | — — | 7 0 | — — | — — |
| 46 | arriving at EDINBURGH | 9 30 | 10 0 | 12 45 | 2 30 | 4 15 | 4 40 | 7 15 | 9 15 | 12 20 |

**Edinburgh to Glasgow.**

| Miles. | DEPARTURE FROM STATIONS. | 7 Morn. 1st, 2d, 3d, 4th, Classes | 8 30 Morn. 1st and 2d, Mail. | 11 Foren. 1st, 2d, and 3d Classes | 1 After. 1st and 2d, Mail. | 1 50 After. 1st, 3d, Goods. | 3 After. 1st and 2d Classes | 5 After. 1st, 2d, 3d, 4th, Classes | 7 30 Even. 1st and 2d, 3d, 4th Classes | 10 Even. 1st and 2d Mail. |
|---|---|---|---|---|---|---|---|---|---|---|
| | TRAINS LEAVE | H. M. | H. M. | H. M. | H. M. | H. M. | H. M. | H. M. | H. M. | H. M. |
| | EDINBURGH | 7 0 | 8 30 | 11 — | 1 — | 1 30 | 3 — | 5 0 | 7 30 | 10 — |
| 4 | Gogar . . | 7 14 | — — | — — | — — | 1 15 | — — | 5 10 | — — | — — |
| 7 | Ratho . . | 7 24 | — — | — — | — — | 1 25 | — — | 5 18 | 8 5 | 10 50 |
| 10½ | Winchburgh | 7 40 | — — | — — | — — | 2 10 | — — | 5 30 | — — | — — |
| 16½ | LINLITHGOW | 7 54 | 9 0 | 11 30 | 1 30 | 2 30 | 3 30 | 5 45 | 8 5 | 10 50 |
| 21 | Polmont . | 8 8 | — — | 11 40 | — — | 2 45 | — — | 5 55 | — — | — — |
| 24½ | FALKIRK . | 8 20 | 9 13 | 11 50 | 1 48 | 3 — | 3 48 | 6 5 | 8 25 | 11 15 |
| 30½ | CASTLECARY | 8 35 | 9 30 | 12 5 | 2 0 | 3 20 | 4 0 | 6 22 | 8 40 | 11 35 |
| 34½ | Croy . . | 8 45 | — — | — — | — — | 3 35 | — — | 6 32 | — — | — — |
| 39½ | Kirkintilloch | 9 0 | 9 45 | 12 25 | — — | 3 50 | 4 15 | 6 45 | — — | — — |
| 43½ | Bishop-Brigg | 9 10 | — — | — — | — — | 4 — | — — | 6 55 | — — | — — |
| 46 | arriving at GLASGOW at | 9 30 | 10 0 | 12 45 | 2 30 | 4 15 | 4 40 | 7 15 | 9 15 | 12 20 |

FARES.

| FARES FROM GLASGOW TO | 1st. | 2nd. | 3d. | 4th. | FARES FROM EDINBURGH TO | 1st. | 2nd. | 3d. | 4th. |
|---|---|---|---|---|---|---|---|---|---|
| | s. d. | s. d. | s. d. | s. d. | | s. d. | s. d. | s. d. | s. d. |
| Bishop-Briggs | 0 6 | 0 6 | 0 3 | 0 2 | GOGAR . . . | 0 2 | 0 6 | 0 4 | 0 4 |
| Kirkintilloch | 1 0 | 0 6 | 0 4 | 0 3 | RATHO . . . | 1 4 | 1 0 | 0 8 | 0 6 |
| Croy . . . | 2 0 | 1 0 | 0 9 | 0 5 | WINCHBURGH . | 2 0 | 1 6 | 1 0 | 0 8 |
| CASTLECARY . | 2 9 | 2 0 | 1 0 | 0 8 | LINLITHGOW . | 3 0 | 2 3 | 1 6 | 1 0 |
| FALKIRK . . | 4 0 | 3 0 | 1 9 | 1 2 | POLMONT . . | 3 9 | 2 9 | 2 0 | 1 2 |
| POLMONT . . | 4 6 | 3 3 | 2 3 | 1 6 | FALKIRK . . | 4 8 | 3 3 | 2 3 | 1 4 |
| LINLITHGOW . | 5 3 | 3 9 | 2 6 | 1 8 | CASTLECARY . | 5 6 | 4 0 | 2 9 | 2 0 |
| WINCHBURGH . | 6 3 | 4 6 | 3 0 | 2 0 | CROY . . . | 6 0 | 4 6 | 3 0 | 2 2 |
| RATHO . . . | 7 0 | 5 0 | 3 6 | 2 4 | KIRKINTILLOCH | 7 0 | 5 0 | 3 6 | 2 3 |
| GOGAR . . . | 7 6 | 5 6 | 3 9 | 2 6 | BISHOP-BRIGG | 7 6 | 5 6 | 3 9 | 2 6 |
| EDINBURGH . | 8 0 | 6 0 | 4 0 | 2 6 | GLASGOW . . | 8 0 | 6 0 | 4 0 | 2 6 |

GLASGOW AND GREENOCK RAILWAY—*continued.*

DOWN—GLASGOW TO GREENOCK AND COAST STATIONS.

| STATIONS. | Morn. | Fore. | After. | After. | After. | FARES. 1st Class. | 2d Class. | 3d Class. |
|---|---|---|---|---|---|---|---|---|
| FROM | H. M. | H. M. | H. M. | H. M. | H. M. | s. d. | s. d. | s. d. |
| Glasgow . . . . . at | 9 0 | 11 0 | 1 0 | 3 0 | 5 0 | | | |
| Paisley . . . . . | 9 15 | 11 15 | 1 15 | 3 15 | 5 15 | 1 0 | 0 9 | 0 6 |
| Houston . . . . . | 9 25 | — — | — — | 3 25 | — — | 1 4 | 1 0 | — — |
| Bishopton . . . . . | 9 37 | — — | — — | 3 37 | — — | 1 8 | 1 2 | — — |
| Port-Glasgow . . . . | 9 45 | 11 45 | 1 45 | 3 45 | 5 45 | 2 3 | 1 4 | 1 0 |
| Arriving at Greenock . . . . | 9 55 | 11 55 | 1 55 | 3 55 | 5 55 | 2 6 | 1 6 | 1 0 |
| COAST STATIONS From | | | | | | 1st Class & Cabin | 2d Class & Cabin | 3d Class & Stage. |
| Greenock . . . . . at | 10 0 | — — | 2 0 | 4 0 | — — | | | |
| Gourock . . . . . | 10 25 | — — | — — | 4 25 | — — | 2 9 | 1 9 | 1 2 |
| Dunoon . . . . . | 10 45 | — — | — — | 4 45 | — — | 2 9 | 1 9 | 1 2 |
| Arriving at Rothesay . . . . . | 11 30 | — — | — — | 5 30 | — — | 3 0 | 2 0 | 1 3 |
| and Helensburgh . . . . | 10 30 | — — | 2 30 | 4 30 | — — | 2 9 | 1 9 | 1 2 |
| Row and Roseneath . . | 10 45 | — — | — — | 4 45 | — — | 2 9 | 1 9 | 1 2 |
| Garelochhead . . . . | — — | — — | — — | 5 30 | — — | 3 0 | 2 0 | 1 3 |

UP—COAST STATIONS AND GREENOCK TO GLASGOW.

| COAST STATIONS. | Morn. | Fore. | Noon. | After. | After. | FARES. 1st Class & Cabin | 2d Class & Cabin | 3d Class & Stage. |
|---|---|---|---|---|---|---|---|---|
| LEAVE | H. M. | H. M. | H. M. | H. M. | H. M. | s. d. | s. d. | s. d. |
| Rothesay . . . . about | 8 0 | — — | — — | 2 0 | — — | 3 0 | 2 0 | 1 3 |
| Dunoon . . . . . | 8 45 | — — | — — | 2 45 | — — | 2 9 | 1 9 | 1 2 |
| Gourock . . . . . | 9 5 | — — | — — | 3 5 | — — | 2 9 | 1 9 | 1 2 |
| Garelochhead . . . . | 8 0 | — — | — — | — — | — — | 3 0 | 2 0 | 1 3 |
| Row and Roseneath . | 8 45 | — — | — — | — — | — — | 2 9 | 1 9 | 1 2 |
| Helensburgh . . . . | 9 0 | — — | 11 0 | 3 0 | — — | 2 9 | 1 9 | 1 2 |
| Arriving at Greenock . . . . | 9 25 | — — | 11 25 | 3 25 | — — | 1st Class Rail. | 2d Class Rail. | 3d Class Rail. |
| FOR THE TRAINS LEAVING | | | | | | | | |
| Greenock . . . . . at | 9 30 | 10 30 | 12 30 | 3 30 | 5 30 | 2 6 | 1 6 | 1 0 |
| Port-Glasgow . . . . | 9 38 | 10 38 | 12 38 | 3 38 | 5 38 | 2 3 | 1 4 | 1 0 |
| Bishopton . . . . . | — — | 10 50 | — — | 3 50 | — — | 1 8 | 1 2 | None. |
| Houston . . . . . | — — | 10 52 | — — | 3 52 | — — | 1 4 | 1 0 | None. |
| Paisley . . . . . | 10 0 | 11 0 | 1 0 | 4 0 | 6 0 | 1 0 | 0 9 | 0 6 |
| Arriving at Glasgow . . . . | 10 30 | 12 20 | 1 20 | 4 20 | 6 20 | 2 6 | 1 6 | 1 0 |

ORR'S OMNIBUSES leave GREENOCK for GOUROCK and ASHTON on the arrival of the Trains from Glasgow.

OMNIBUSES run between GREENOCK and PORT-GLASGOW every Hour, from 12 Noon till 8 P.M.—Fare 4d.

For an excellent and comfortable Hotel at the Greenock terminus, see Mr Bruce's Railway Hotel Advertisement, page 45.

*Facsimile pages from "Murray's Time Table" of April, 1845 (the first monthly issue of that publication), showing the fourth class trains and fares referred to by our correspondent in the accompanying letter*

EMPIRE EXHIBITION IN SOUTH AFRICA, 1936.—The South African Conference (steamer) lines have agreed that exhibits, &c., shipped outwards for the Johannesburg Exhibition are to be charged freight at the full tariff rates, but any exhibits unsold, and also all stands and apparatus, will be conveyed homewards freight free. The Department of Customs and Excise has informed the authorities that all goods imported into the exhibition other than goods intended for sale, will be admitted without payment of duty, and can be re-exported duty free. On goods intended for sale, duty will be payable as stocks are drawn from bond.

# PUBLICATIONS RECEIVED

**Hundert Jahre Deutsche Eisenbahnen** (Centenary of the German Railways). Berlin : German State Railway. 11 in. × 8½ in. × 2 in. 543 pp. + interleaved illustration plates (including coloured folding-plate frontispiece and 3 coloured maps). No price stated.—The centenary last year of the opening of the first steam railway on German soil, and the celebrations in connection with that event, have produced many very fine volumes, certain of which have already been reviewed in our columns. Naturally, it has been the aim of each compiler or author to approach his subject from a special angle and, therefore (despite unavoidable overlapping), the centenary literature constitutes a comprehensive railway historical library in the German language. Pride of place must, however, be given to the volume which is the subject of our present notice, as it is doubtful whether so much detailed and authoritative information has ever before been presented within the covers of one volume. The building up of the German railway system is fully described, and biographical sketches are given of such famous pioneers as List, Harkort, von Baader, Scharrer, von Denis, and many others. German railway development is divided into periods, namely : early days ; 1840-1870 ; the Franco-Prussian War period and its aftermath ; the nationalisation era, 1885-1914 ; the European War years ; and the evolution of the Reichsbahn.

Among the most valuable features assisting towards the understanding of German political and railway development, are the coloured maps showing the loosely-knit territories within the borders of the Imperial Alliance headed by Austria ; then the formation of the Zollvereins ; and the Empire which emerged from the Austro-Prussian War of 1866, and the conflict with France four years later. From two black and white maps in juxtaposition an interesting similarity may be noticed between the railway network proposed in 1833 by Friedrich List (which, as has been frequently observed, was subsequently built piecemeal) and the basic scheme of motor roads (Reichsautobahnen) adopted last year, and now in course of construction. Incidentally, the interrelation of the railway and road organisations under the general control of the Leader and Chancellor, is clearly shown in the form of a chart.

Every aspect of railway working is not only dealt with but handsomely illustrated. Colour is used wherever necessary, such as for signal aspects. Historical and modern illustrations throughout are reproduced in effective contrast, and this is particularly noticeable in the chapters devoted to railway bridge building and stations. After the permanent structures have been disposed of, rolling stock forms the subject of some 140-odd pages exclusive of interleaved plates. Amidst the wealth of material presented it is difficult to particularise, but in view of the attention now being given to railcars, special interest attaches to pictures of a pioneer six-wheeled steam railcar of 1880, a double-deck Krauss vehicle introduced on the Bavarian Railways in 1882, and a Daimler product of 1900, all of which may be considered ancestors of the Fliegender Hamburger and its sister trains.

A chronology from 1803 to 1935 which occupies 18 pages, an index of 13 pages, and a 5-page contents, combine to make the volume as ready a reference work as is possible. This notable production closes by giving inside the back cover three loose folding maps showing respectively the German railways, in 1885 (half-way through the century) ; in 1914 ; and in 1935. The pre-war one shows the various State systems in distinctive colours, and the current map the divisional organisations.

**Henschel Heft, No. 5. 1935.** Kassel : Henschel & Sohn A.G. 11¾ in. × 8¼ in. 96 pp. Fully illustrated. Price not stated.—This interesting publication marks very fittingly the centenary of German railways and the 125th anniversary of the firm of Henschel & Sohn. The keynote of the foreword is that railways, which have become one of the principal factors in economic life, and the safest and most reliable of all means of transport, are still in the forefront of progress, meeting the varied requirements of different communities in a way that ensures their continued development. Ample evidence in support of this claim is to be found in this richly illustrated review of outstanding constructions, dating back to the *Drache* of 1848—the first of more than 23,000 Henschel locomotives—but dealing mainly with representative modern types built for leading railways in many parts of the world. The publication is of definite international interest, and of considerable value for reference purposes, leading particulars being given of all the locomotives illustrated. In addition, there are tables of dimensions and performance of more than 50 examples, and a number of sectional drawings including a large folding plate of the Series 61 streamlined tank locomotive built for the German State Railway Company.

The scope of the work includes light and heavy steam locomotives of all classes, electric, and diesel locomotives, and railcars, and the information given is of general interest to railway engineers in all countries. The book is, in fact, by no means to be regarded simply as a record of Henschel achievements. Indeed, it errs on the side of modesty by making no reference to the excellent equipment and practice of the Henschel works, of which we have first-hand knowledge. Among the features of special interest, many of which have an important bearing on railway progress in general, there are articles on streamlining developments in Germany, an excellent review of streamline constructions in all countries, a critical review of steam, electric and heavy oil prospects, and a survey of express locomotive developments in Germany during the past 50 years.

In addition, there is a full description of the new locomotives built for the Chilean State Railways, with standardised components, a description of the Henschel condensing locomotive for Russia, with performance data, and an interesting article on steered-bogie developments. Among the many machines illustrated we notice the superheated express locomotives, Class 16E, of the South African State Railways, and the 2-4-2 streamlined tank engine and other recent constructions for the Lübeck-Büchener Railway. Special mention must be made of Dipl.-Ing. H. von Gontard's interesting impressions of Australia, supplemented by an appreciation of Australian locomotive construction, and all lovers of fine photographs will be grateful to Direktor S. J. Walter Hardebeck for the reproductions from his travel album. From every standpoint, it may be said of this fine publication that it is worthy of the firm of Henschel and of the occasions it celebrates.

**Walking at Week-ends.** By S. P. B. Mais. London : the Southern Railway. 7 in. × 4½ in. 128 pp. Illustrated. Price 6d.—Mr. Mais is so popular an advocate of the British countryside that even confirmed motorists may be persuaded to forsake the by-pass for the footpath by this collection of walking tours in Southern Railway territory. Mr. Mais has already dealt with the country accessible in the day from London in "Southern Rambles," and now takes his readers farther afield—to the coastal and inland beauties of Kent, Sussex, and Hampshire. He therefore gives several walks from each centre of his choice, so that readers may extend their excursions over a healthy week-end, selecting Canterbury, Folkestone, Hastings, Eastbourne, Pulborough, Haslemere, Chichester, or Brockenhurst as their centre. A foreword by Sir Laurence Chubb, Vice-President of the Ramblers' Association, and Secretary of the Commons, Open Spaces, and Footpaths Preservation Society, emphasises the fact that Mr. Mais has confined his directions throughout to footpaths and bridleways. The booklet has many photogravure views of scenic and historical interest, and a map for each ramble. By confining their detail to essentials, the latter are able to give clearly all the detail required within the space of a page, and so users will be spared struggles with self-willed maps of the folding variety on wet and windy days. The style of binding is a further recommendation of this pocket-sized booklet for the all-weather use to which in this country it will inevitably be put.

# THE SCRAP HEAP

A package collected by the Islington depot of Carter, Paterson & Co. Ltd., where Mr. Carroll is Superintendent, was forwarded to Canada, and eventually arrived at Calgary, Alberta, where it passed through the hands of Mr. Carroll's *brother* who is employed by one of the Canadian railways. The long arm of coincidence in this case must have been 4,000 miles long.

* * *

£12,000 having been made available for steam-rolling a section of the Achill road, Mayo County Council have made representations to the Great Southern Railways Company to resume the passenger service on the line from Westport to Achill while operations were in progress, the engineer having reported that the buses and lorries would hold up the workers and impair the quality of the work.—*From "The Irish Times" of January 8.*

* * *

On the escalator, which was rather crowded, all eyes seemed to be turned to a delightful-looking old couple: he with a snow-white beard and very spick-and-span, and she very demure in black. They were just standing side by side, and I heard someone say, "What a dear old Darby and Joan." I thought so, too—until I got to the top, and, waiting for them to move from the stairway, heard the old lady say: "You got me on the b—— thing; now you can get me orf!"—*Miss Violet Letts, writing in the "Evening News."*

* * *

"Autolycus," *The Financial Times* Stock Exchange correspondent, writes the following in connection with his collection on behalf of the Infants' Hospital, Vincent Square:—

"A curious old book is 'Bradshaw's Shareholders Guide, Railway Manual and Directory, 1858, published at 7s. 6d.' It runs to over 500 pages and contains all sorts of information, most of it very quaint and quite a lot decidedly amusing. Another book, 'dated 1824, price 3s.,' is 'Fortune's Epitome of Stocks and Public Funds,' by a member of the Stock Exchange whose name is not given. This is one of the most curious things that we have come across, and in its 120 pages is a remarkable variety of information 'for perfectly understanding the nature of the securities in the Stocks and Public Funds.' May we invite *bids on behalf* of our *Little Sick Folk?*"

* * *

Mr. J. C. L. Train, whose paper on "Modern Methods of Permanent Way Maintenance" to the Institute of Transport last Monday is reported on p. 122, quoted the following letter from a town-bred railwayman stationed at a lonely spot on the West Highland Railway where it crossed Rannoch Moor:—

Sir,—With reference to my application of the 15th inst., I would respectfully point out to you that my grounds for applying for a transfer are that I am unable to stay any longer here as the house that I am in shows visible signs of it being haunted.

The extraordinary moving of furniture at night and other signs leaves no room for doubt. I am unable to sleep at night with the strain. This has occurred for some time now, and I appeal to you to investigate the matter. My workmate and bedmate confirms my statement.

The appeal was successful in securing the writer's transfer to less psychic surroundings.

* * *

ZONE TIME IN THE U.S.A.

The following letter to the Editor of our American contemporary, the *Railway Age*, appeared recently:—

With the city council of Chicago voting to place Chicago permanently on Eastern Standard time effective March 31, 1936, now is the time to extend Eastern Standard time to the Mississippi river and to all cities and towns on both banks. With Cincinnati and Chicago on Eastern time, confusion will be felt at Louisville and St. Louis. Travellers will miss trains, as many will not know or remember what time to use when daylight saving time is in use.

THOMAS C. POWELL

* * *

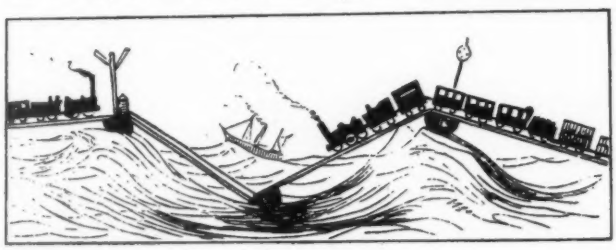
TRAIN THRILLS

The second picture at the Carlton is a competent creation by Twickenham Film Distributors. It shows a breathless whirl of events. In "The Last Journey" the driver of an express makes his last trip before being compulsorily retired, whilst lashed into jealous fury by the suspicion that his wife has been false to him. He believes that his mate on the engine is her lover. In maniacal determination he drives his train to destruction. He ignores signals. He compels his fireman at the point of a revolver to assist him, and holds relentlessly to his purpose, sweeping the points at 80 miles an hour. Meantime, literally following in the train are compartmented dramas. At length Godfrey Tearle clambers hazardously along the footboard and hypnotises the madman into subjection This is a fine thriller. —*From the "Sunday Times."*

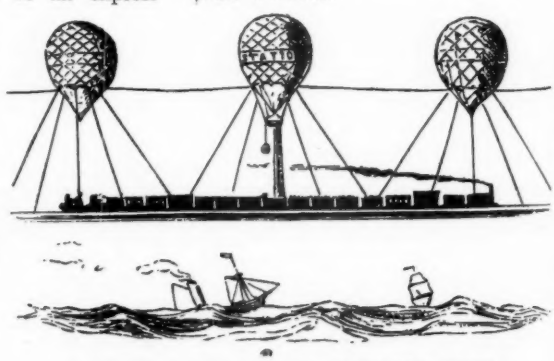
* * *

A PROJECT FOR THE FUTURE

Everybody who is in a hurry to go from London to Paris generally finds the Channel an especial nuisance. We don't know what Sir Isambard Brunel's sentiments may be as to tunnelling it, and we don't care, because we have a plan of our own. We don't give the estimates and specifications, as we have no time to draw them up, and, indeed, would not if we had; but we submit a couple of rough sketches for the consideration of Messrs. Cubitt, Grissell and Petro, and other eminent gentlemen in the practical line of life. As we believe great improvements may take place in the facility with which a train can be made to run up and down an incline, we propose to carry a line of rails from Folkestone to Boulogne by means of a bridge of boats, the rails to work on hinges on board each boat, so as to yield freely to the action of the sea. The subjoined sketch shows a couple of trains crossing in a gale of wind. In case, however, the above scheme should be found impracticable, we beg to suggest another. The accompanying representation explains itself. We call the scheme the projected channel balloon line. A full prospectus, giving all the requisite information, will shortly be issued; and, in the meantime, applications may be made for shares to anybody whom the applicant thinks likely to possess them.—*From "The Comic Bradshaw or Bubbles from the Boiler," by Angus B. Reach. Published in 1848 by D. Bogue, 86, Fleet Street, London, price sixpence.*



**PROJECTED CHANNEL LINE.**



**PROJECTED CHANNEL BALLOON LINE.**

*Suggestions of 1848 for simplifying the Channel crossing*

# OVERSEAS RAILWAY AFFAIRS

*(From our special correspondents)*

## ARGENTINA

### Rice Production in Argentina

During the last few years the cultivation of rice has made important strides in Argentina, and considering that production is confined almost entirely to the Northern provinces and territories, in which climatic conditions are favourable, the cultivation of this cereal has already reached respectable proportions, and promises to develop into a valuable source of revenue to the railways serving the zones of production. According to statistics issued by the Ministry of Agriculture, the production in 1934-35 amounted to 34,913 tons, or 1,403 tons higher than in 1933-34, although the area sown was smaller than in the preceding year. The average yield per acre in 1934-35 was the highest for six years. The quantity exported during 1934 and the first six months of 1935 was 865 tons. The total production during the last six years has risen from 6,018 tons to 34,913 tons.

## NEW ZEALAND

### Workshops Efficiency

In a special report on the November apprentice examinations in the N.Z.R. workshops, Mr. A. McFayden, B.Sc., M.I.Mech.E., expressed the wish that every apprentice in New Zealand had the same opportunities as those in the service of the Railway Department. He made particular comment upon the practical nature of the questions in drawing and trade theory as testing the powers of observation of the apprentices. The 98 apprentice examinees included 56 fitter-turners, 16 boilermakers, 10 moulders, 4 tinsmiths, 4 carpenters, 3 blacksmiths, 3 patternmakers, and 2 coppersmiths. Mr. McFayden noted a decided improvement in the technique of the apprentices, in setting out the problems, sketching, and drawing as compared with previous years. The Railway Department runs its own school for apprentice training, and since the inception of these examinations in 1930 a gradual improvement has been noted in each succeeding year.

### Effective Transport Control

The General Manager of Railways, Mr. G. H. Mackley, stated recently that in New Zealand the principle of transport regulation has been recognised as the only feasible course to reduce transport costs for the community, and that where the principle is judicially applied in accordance with the terms of existing legislation, undoubted benefit must accrue not only to the industry but to the country as a whole.

The annual report of the Transport Department indicates the net result so far achieved in the licensing of road passenger services, as under:—

(*a*) A saving of approximately 10,000,000 vehicle-miles per annum as compared with the figures for the year before the licensing system came into operation.

(*b*) A saving of approximately £300,000 per annum in vehicle operating expenses.

(*c*) A substantial saving in wear and tear on the roads.

(*d*) The freeing of approximately £500,000 capital invested in the industry for use in other avenues of investment.

(*e*) Improvement in regularity of services.

(*f*) Improvement in standard of vehicles in use, with greater comfort and safety to the travelling public.

(*g*) Reduced fares in numerous instances.

(*h*) More healthy financial position of passenger service operators.

After extensive inquiry by the Transport Co-ordination Board its conclusions are summarised as follow:—

(1) The intensive policy of all forms of transport in seeking for business has produced a lowering of rates, which in some cases has become uneconomical.

(2) This policy has been carried out in some places where shipping is in competition with road and rail transport to such an extent as to cause serious loss to coastal shipping and harbours.

(3) In some cases the destruction of capital outlay in harbours—for instance, Whangarei and Wanganui—is threatened.

(4) Coastal shipping is in grave jeopardy.

(5) Rates charged to certain places and by certain methods are exceptionally low, and have a discriminatory effect on various localities and forms of business.

(6) Rates are no longer fixed, but subject to changes to obtain business in particular circumstances.

(7) The new system of rates has pushed trade into new channels, and may involve a loss of invested capital and a dislocation of business which tends to reduce public wealth.

It recommends:—

(1) That legislation be introduced on the lines of the English Road and Rail Traffic Act providing for appeals to a rating tribunal against any rate objected to as unfair to a competing form of transport.

(2) That such a tribunal should also have power to originate investigations into transport charges, and to make orders where necessary.

### Fencing Responsibility

A problem of some magnitude in New Zealand is the maintenance of boundary fences adjoining railway land. So much of the country alongside the 3,000 miles of track is used for grazing sheep or cattle, that good fencing is necessary for both stock and railway safety. The Government Railways Board has now decided to undertake the maintenance of fences as a measure of safety against accident due to straying stock. As soon as the necessary materials and men can be assembled in the different districts throughout the country, the department will create special fencing gangs to overhaul and repair in a thoroughly systematic and satisfactory way all boundary fences which require attention. It is the intention of the department to attend to the more urgent cases first

The board's decision to revert to the practice of maintaining boundary fences, which was abandoned purely on the grounds of economy during the depression, was influenced by the improvement which had taken place in the finances of the department, and by the very great difficulty and other complications that the alteration in the practice brought about, in the way of having fences repaired satisfactorily and promptly, more particularly when fire damage occurred and when it was assumed by adjoining owners that the department was responsible for this damage when the department had definite evidence to the contrary.

## INDIA

### Chambers of Commerce on Transport

His Excellency the Viceroy opened the annual meeting of the Associated Chambers of Commerce at Calcutta on December 16. His Excellency's address dealt succinctly with various matters that have interested the commercial public during the year. Referring to the Roads Congress inaugurated last year, Lord Willingdon stated that there was no question of the very great need for road development. The Government of India had, therefore, decided to defray the cost of the congress for a further period of two years. Referring to the progress of civil aviation, His Excellency observed that while important developments had taken place in South India, the Indian National Airways, he regretted, had been compelled, through lack of public support, to close down the services between Calcutta and Dacca and between Calcutta and Rangoon. His Excellency viewed with satisfaction indications of a gradual movement towards economic recovery in India.

### Coal Freights

On the motion of the Bengal Chamber of Commerce, the meeting passed a resolution recommending the Railway Board to give its serious consideration, in the best interests of the coal trade and of the railways in India, to the question of granting a special rebate in freight on coal exported to foreign ports. The mover pointed out that the large export trade in Indian coal with Ceylon and the Far East prior to the war had been reduced considerably by the Government embargo on the export of coal. The South African Government actively promoted the export of South African coal to markets formerly held by India. The

latest inroad of South African coal was in the Ceylon market where South African coal was offered at a price which, after deducting normal transport and handling charges, leaves little over one rupee as the price of coal per ton at pit's mouth. It was, therefore, apparent that the South African Government was giving substantial subsidies in the form of concessions in transport and handling charges. The grant of a special reduction of railway freight on coal exported to foreign countries would not seriously affect railway revenues, as such exports were very small at present. On the other hand, there was the possibility of a substantial increase in exports in a year or two, which would benefit both the coal trade and the railways.

### Railway Freights Problem

The following resolution relating to railway freights was carried *nem. con.* at the instance of the Upper India Chamber:—

"That in the opinion of this Association, the economic recovery of India is intimately bound up with the adjustment and coordination of railway goods tariffs. This association, therefore, calls upon the Government to appoint a special committee with full powers of investigation and with which commerce, industry and agriculture should be associated to inquire into the matter and, if found advisable, to appoint a permanent Railway Rates Tribunal for all India."

Speaking on the resolution, Mr. T. Gavin Jones, a prominent business man in Upper India, stated that the results of the conference held at Delhi in July last to discuss railway tariff matters were not satisfactory. The conference avoided the main purpose of the resolution passed by the Associated Chambers last year. Commercial opinion wanted a thorough overhaul of the system and methods by which railway goods freight rates were arranged. Mr. Jones had long urged that the tariffs should be so adjusted as to facilitate and encourage internal trade, develop the manufacturing industries of the country and lighten the burden of freight charges on goods for export.

### Upper India Chamber's Suggestions

After citing a number of anomalous freight charges and showing the varying schedules obtaining on different railway systems for the same commodity, Mr. Jones said that the goods tariffs bristled with such anomalous rates. On the other hand, there were many instances in which freight charges could be raised without hardship on the public. Such enhancement might enable the railways to effect reductions on essential raw materials for industries and on agricultural products. The present system whereby each railway fixed its own rates in an apparently arbitrary manner did not promote the growth of trade and industry. The Indian Industrial Commission had criticised the prevailing rates procedure and recommended that internal traffic should be rated as nearly as possible on an equality with traffic of the same class to and from the ports.

Mr. Jones added that the whole direction of trade and industry could be altered by the misdirection of railways freight rates. Industries under modern conditions had to be developed in the most economical geographical positions with the assistance of the railways.

In Mr. Jones' opinion, if India is to recover economically, it is essential that the railway goods tariffs should receive the consideration of a representative and expert body that is capable of taking wide views on the subject and making a close study of the problem in the interests of all concerned. The constitution of a permanent Railway Rates Tribunal, similar to the Rates Tribunal in England and the Inter-States Commerce Commission in America, is urgently required to control railway rates and fares and to bring the railway systems up to date. The findings of experts on the tribunal will permit the railways to earn a reasonable profit and at the same time assist the development of internal trade and export business of the country. The present Rates Advisory Committee is an unsatisfactory compromise.

## NORWAY

### Alteration in Passenger Train Fares

Considerable alterations and simplification in passenger train fares were recently introduced by the State Railways. The principal change is the abolition of the supplementary fare for express trains, which results in a reduction of 10 per cent. in the fares for most journeys by them, and more for the shorter distances. The rates per kilometre for ordinary passenger trains have also been reduced and new scales introduced. Hitherto the charges have been based on rates laid down in 1931, namely:—

| | |
|---|---|
| Up to 150 km. ... ... | 5·0 öre per km. |
| 150 to 300 km. ... ... | 4·5 ,, ,, |
| 301 to 400 km. ... ... | 4·0 ,, ,, |
| Over 400 km. ... ... | 3·0 ,, ,, |

plus an increase of 10 per cent. added in 1933.

The new rates are:—

| | |
|---|---|
| Up to 200 km. ... ... | 5·5 öre per km. |
| 201 to 400 km. ... ... | 5·0 ,, ,, |
| 401 to 500 km. ... ... | 4·0 ,, ,, |
| Over 500 km. ... ... | 3·0 ,, ,, |

The minimum fare is now 30 öre instead of 35 öre. For distances up to 300 km., return tickets are obtainable at 9 öre per km. for distances up to 200 km., and 14·0 öre per km. afterwards, with a minimum fare of 50 öre. Second class fares are half as much again as third, and first class are double the second. Although ordinary fares are not very much affected by these changes, the passenger who travels both ways by express trains now gains considerably, and it is hoped that this will cause some lost traffic to be recovered. No alteration has been made in weekly, party or season tickets.

## FRANCE

### Engineering Works on the Etat

Extensive works are now under way at Rennes and Le Mans in the modernisation of the stations and layouts. At Rennes the station is being completely rebuilt; the approach lines and sidings are being modified and extended, and two platforms lengthened by 300 ft. As one approach is in a cutting this has had to be widened considerably to take the extra platform length and siding accommodation, and the total cost of the works is estimated at fr. 20,000,000. At Le Mans the sharply-curved approach at the south end of the station is being realigned, and the layout of the crossover roads changed to permit of the more efficient use of the platforms.

### Railway Works Expenditure in 1936

In addition to approving plans for the purchase of new rolling stock, the Conseil Supérieur des Chemins de fer has also approved a comprehensive programme of railway works for 1936. The total estimate for the proposed works was fr. 1,394,400,000, but the council reduced this amount by fr. 73,000,000. For electrification, safety, and other works, the estimated outlay is fr. 552,600,000. The sum set aside for electrification is fr. 105,900,000. This is much below last year's expenditure under the same head. The reduction is due to the completion of the work on the Montauban-Sète and Orleans-Tours lines. This year's estimate provides for the electrification of the line from Massy-Palaiseau to Saint-Rémy-les-Chevreuse in the outer suburban district south of Paris and from Argenteuil to Conflans on the line from Paris to Mantes.

### Safety Measures

Expenditure on safety works is estimated at fr. 189,700,000. The programme includes improvements of signals and interlocking and permanent way safety appliances. On the Midi system, electro-mechanical signalling of the Saxby pattern is to be installed at the larger stations on the line from Bordeaux to Sète. There will be a further extension of track circuiting on the P.L.M. lines. Improvements are to be made at Achères and elsewhere, while the permanent way generally is to be brought up to a higher standard for the running of fast expresses.

### Unemployment Relief Works

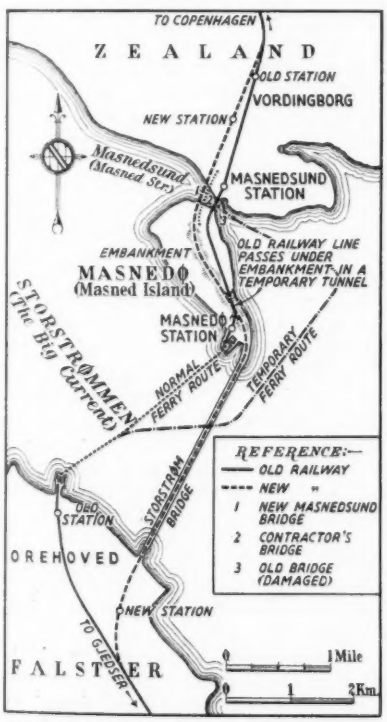
Cost of installation of the new standard signalling aspects and the adoption of the automatic block system is included in the Government's programme of unemployment relief works. Miscellaneous expenditure amounting to fr. 101,300,000 is mainly devoted to improvements in the efficiency of the Juvisy and Sotteville marshalling yards, various depots and workshops, and the installation of sheds for railcars

at Batignolles (Paris) and Rennes. Other expenditure, amounting to fr. 85,200,000, will provide for the continuation of improvement works already begun and be allocated to station improvements at Brest, Angers, Bordeaux-Saint-Jean, and Mulhouse, as well as to extensions and improvements of platform lines at Bordeaux, Nantes and Havre. For readaptation and improvement of existing rolling stock and other material, the sum of fr. 183,000,000 is set aside. It will be used for increasing the power of locomotives already in service, the formation of stores of spare parts for railcars, installing new systems of heating and ventilation in coaches, and for the completion of the fitting of continuous brakes to goods wagons.

# DENMARK

### Masnedsund Bridge Destruction

On December 12 an unusual accident occurred which seriously impeded traffic on the Copenhagen-Gjedser (Warnemünde-Hamburg-Berlin) main line of the Danish State Railways for 11 days. In connection with the great bridge under construction across Storstrømmen, a new combined rail-and-road bridge has just been built across the narrow strait between the islands of Zealand and Masnedø to replace the old low-level railway bridge, and between these two bridges, which are only a few hundred yards apart, a third temporary bridge has also been erected to carry the contractor's trains during the construction of the high embankment across Masnedø. The old bridge is a swing bridge, while the two others are single-bascule bridges. Because of the short distance between these three bridges, navigation is very difficult, and several minor collisions have taken place during the last couple of years.




*Sketch map showing the three parallel Masnedsund bridges, Storstrøm Bridge and normal and temporary ferry routes*

On December 12, however, a British tanker got out of control during the passage of the three bridges, with the result that it completely missed the channel through the swing-span of the old bridge and collided with one of the neighbouring fixed spans, pushing it right off one pier into the water and damaging it seriously. The end of the displaced span for a short time rested on the prow of the vessel, but for fear of its sinking the ship the pilot backed the vessel away until the span fell off into the sea. The illustrations on page 120 give some idea of the results of the collision.

### Temporary Rail Connection

It was particularly important for the State Railways to re-establish rail-connection with Masnedø in time for the heavy Christmas traffic, and after hurried calculations and consultations with Dorman Long & Co. Ltd., the main contractors for the Storstrøm and Masnedsund bridges, it was decided to establish rail connection across the new bridge by building up temporary embankments at each end, but the rail-level of the new bridge is about 20 ft. higher than that of the old one. Consequently a very considerable quantity of earthwork, aggregating about 450,000 cu. ft., had to be thrown up. This was completed in less than ten days, and the first train crossed the new bridge on the morning of December 23. Fortunately the new bridge is practically finished, as otherwise it would have been necessary to repair the old one, a task hardly likely to have been completed in so short a time. It has not yet been decided whether the old bridge is to be repaired or not. It is to be dismantled in any case in a year or two, but it will delay the completion of the Storstrøm bridge if the new Masnedsund bridge has to carry public railway traffic from now onwards, as the contractors have reckoned on having the full use of both its railway and roadway.

### Handling Traffic during Interruption

The following methods were adopted to carry on traffic during the ten days' isolation of Masnedø: When the tide was high enough, the ferries from Orehoved proceeded direct to the village of Masnedsund, the harbour being immediately adjacent to the railway station there; but when the tide was low, or there was fog, the ferries proceeded as usual from Orehoved to Masnedø, and passengers and luggage were brought by train to the collapsed bridge, and they then had to proceed on foot across the new bridge to Masnedsund station. The average delay to all trains was, however, only about 50 minutes. All through coaches and sleeping-cars between Copenhagen and Hamburg and Berlin were terminated at Orehoved. Goods to and from Falster were conveyed by ferries between Korsør and Orehoved or between Copenhagen and Gjedser, and various passenger stock to cope with the Christmas traffic on Falster was also conveyed by the latter route. Across the new bridge banking assistance is required by the heavier trains because of the steep gradients and the slow speed necessitated by the unsettled condition of the new embankments. As the temporary line avoids Masnedsund station, all passengers to and from that place are conveyed by road from or to Vordingborg. The question of who is to pay the damages has not yet been settled, as there is no doubt that navigation through the three successive bridges is very difficult as the three openings are not in a line, and because there is sometimes quite a strong current in the strait.

# EGYPT

### New Railway Construction in Western Egypt

It has been decided to extend the Alexandria-Mariut-Fuka branch of the State Railways westwards along the coast to Mersa-Matrouh, a distance of about 75 km. (46½ m.) A sum of £94,000 has been appropriated from the general reserve by the Cabinet for this purpose. Mersa Matrouh is a centre in Western Egypt, and is some hundred miles east of the Libyan frontier. It is therefore of strategic importance from the point of view of defence, and the British Government is reported to be making a contribution of £20,000 towards the cost of the extension.

# CHINA

### Chekiang-Kiangsi Railway Extension

The route to be followed by the extension of the Chekiang-Kiangsi Railway beyond Nanchang has now been fixed. It passes through Kaoan, Shankao, and Wantsai and terminates at Liling station on the Pinghsiang-Chuchow section of the future Canton-Hankow Railway, and not at Pinghsiang as previously anticipated. It also clears up the doubt formerly prevalent as to whether Nanchang was to be on a branch taking off a direct line running further south from Yushan to Pinghsiang, or on the through alignment. The latter is now the selected route.

December 20 was fixed as the date for the opening of the Yushan-Nanchang section for traffic.

# THE VARIED RESPONSIBILITIES OF A RAILWAY ELECTRICAL ENGINEER

***As a typical example of the scope of an electrical engineer upon a British railway, the career and experience of Mr. J. Dalziel, the recently-retired Assistant Electrical Engineer of the L.M.S.R., are recorded in the article, of which the instalment below is Part I***

THE retirement, recorded this week in our personal columns, of Mr. Dalziel from the position of Assistant Electrical Engineer, L.M.S.R., severs a connection with the former Midland Railway and with the L.M.S. group which began practically with the century.

It was following the transfer of responsibility for outdoor electric motor-driven machinery from the Telegraph to the Locomotive Department of the Midland system, that Mr. Dalziel joined the latter department, and, as in his subsequent appointments, his dual electro-mechanical training at once proved very useful to him. At that time, though there were some 12 electric generating stations on the Midland system, there were only about 17 electric motors, and only one of these (which is still running) was of over 10 b.h.p., whereas now this number has risen to some 3,000 of all sizes on the Midland Division of the L.M.S.R., on which there is a total of 12,000.

Mr. Dalziel's career, therefore, has been coincident with the progressive adoption of electrical methods on railways, and the evolution of organisation for dealing with them. It is of interest as bearing on the reliability and permanence of electrical machinery, which used to be called in question in these early days, that while, with the march of development, Mr. Dalziel has supervised the reconstruction and revision of installations for which, in their original form, he was responsible, many others are still in full operation after lives of up to 36 years with very low maintenance costs. These include plants not only designed but constructed in the railway shops.

### Evolution of Headquarters Organisation

The evolution of headquarters organisation is indicated by Mr. Dalziel's successive appointments recorded in our personal columns, on page 119. Of the reorganisations so indicated, the most significant is that of 1905, under which he became responsible for all new work on, and alterations of outdoor machinery, whether electric, hydraulic or steam driven, as well as for heating and ventilating plant, hotel plant, running shed equipment and the setting out of large shop schemes. His appointment to charge of road motors—of which at the time a large number on the Midland were electric—in conjunction with his responsibility for electric operation, enabled road vehicle supervision and maintenance as well as electric operation and maintenance at outstations to be dealt with by the same staffs, who, together with hydraulic and other mechanical staffs, were generally under the district locomotive superintendents acting through suitably trained assistants.

The amalgamation involved the formation of a separate Electrical Department on the L.M.S.R., which no longer maintained road motors or other than electrically driven machinery, but it retained responsibility for both the electrical and the mechanical sections of electrically driven plant until 1932, when the mechanical portions were re-transferred to the Chief Mechanical Engineer. Mr. Dalziel continued, however, to be associated with this side of the work after that date, and by special arrangement reported upon it to the Chief Mechanical Engineer, to whose staff he was transferred on the retirement of Col. Cortez Leigh, the Electrical Engineer, in 1934.

The 1905 reorganisation secured unification of supervision of all similar work and proved entirely satisfactory to the Midland. It placed responsibility, not only for all machinery of similar duty, but for all new work other than locomotive, in one set of hands. Moreover, it placed the whole design, electrical and mechanical, of electrically driven machines in the hands of one staff, the members of which, like Mr. Dalziel himself, were in the main dually trained, and thus ensured that the machines were envisaged not as separate electrical and mechanical entities but as a whole. In this way the best solution of the various problems, whether mechanical or electrical, could be found. Such an organisation clearly avoids the mere grafting of an electric drive on to a pre-conceived mechanical arrangement without predetermination of the best relation between the two, or without study of the best working combination; it also avoids inadequate consideration of apparatus linking the two sections or—as has happened—its omission altogether.

### Capstan Motors

With some machines the whole mechanical design and all the features and controls, manipulation and safety provision may have to be altered to make the best use of electric operation; or the machine itself may even have to be redesigned entirely. This can be done effectively only with informed consideration of the design as a whole. A notable instance of this is the Derby capstan. Electric capstans, though working at $\frac{1}{4}$ to $\frac{1}{5}$ of the cost for energy of hydraulics, entailed in the early d.c. days complicated switchgear, and were expensive. The Midland thereupon made a number of d.c. capstans with simplified contactor gear which suited requirements better and were cheaper than anything that could be purchased; but when a.c. became available, the possibility of simplification by switching direct on to the mains and eliminating most of the switchgear was realised, and a number of capstans were so constructed. The constant-speed characteristic of the squirrel-cage motor with its high overload torque capacity—generally a recommendation—was here, however, found disadvantageous.

Slipping of the haulage rope on the bollard, orthodox with the hydraulic capstan, was ineffective with these, especially—for some reason never explained—on low frequency supplies, as at Birmingham, and the resultant snatching of the ropes caused heavy and expensive rope breakages and renewals. This was a mechanical problem, but a mechanical remedy would have been complicated and expensive; electrically the use of a rotor of high resistance limited maximum torque to a predeterminable excess of normal full load, and in doing so, ensured starting from stalling point and therefore without snatch on any appreciable load. The resulting capstans were as simple as they could be, worked satisfactorily and are in extensive use. The motors were low in efficiency and, as motors, bad, but they were very good capstan motors.

The first motors were supplied under contract to Midland specification; but the firm supplying them went out of business, and motors could not then be purchased to the requisite dimensions and price; so they were made in the railway shops. Later, motors of similar characteristics became generally available, for instance the Maxtorq motor, and such motors—generally specified as to stall

at 100 per cent. over normal full load—have been fitted to purchased capstans of special type, or of capacity in excess of the Derby capstan.

Similarly it was considered necessary to reproduce in electric traversers the operating features of their hydraulic counterparts, namely the ability of the traverser on being started to move to its new position and be stopped there accurately by engaging with stops without the power being cut off. This problem also was solved by electrical methods with push button and automatic direction setting control, timed stop release gear, &c.

### The Derby Organisation

The point is that though the problems of these typical machines were primarily mechanical, their best, if not their only satisfactory solutions were electrical and could be found only under some such organisation as that at Derby, capable of examining the machines in all their aspects. Contractors' assistance in such cases is of value only at a later stage. The railway engineer in touch with the using departments is in the best position to know the conditions to be fulfilled by the machinery to be supplied, and the contractor's entry is best timed—in accord, too, with his own preference—when he can be asked to tender on a definite and competitive basis.

The construction or assembly of the Derby capstans in the railway shops was largely a matter of cost; the standard capstans of manufacturers were generally larger, more complicated and more expensive. The representative of one large firm, examining a Derby capstan, remarked that it was everything that was necessary, but it was too simple for him to dare to try to sell to his normal customers.

The advantages of the organisation above outlined, and of working in the atmosphere of the Locomotive Department, with the facilities of its shops, enabled the electrical section of the department, and its shop and outside staff, to rise to the occasion in many cases when special work was called for, both in the early days and later.

A small electric shop was set up in the locomotive works shortly after Mr. Dalziel went to Derby, and was used for work upon the installation of electric drives in the locomotive shops, testing, the construction of special apparatus of various types, and repairs; of the latter the first large job was the re-winding of a number of electric capstan motors for Oakham that had just been put down, but the varnish used on them by the manufacturers had failed to resist the damp conditions.

With the transfer of all heavy electric work to the Locomotive Department in 1903, the electric shop was much enlarged. It had to overtake the repairs of all the company's generating stations and of arc lamps and other lighting apparatus, as well as of the growing number of motors. Much of the repair work arose from the old Thomson-Houston and Brush constant current long-series arc generators, which formed part of the equipment of most of the generating stations, and it was found possible to reduce these repairs very appreciably by reconstruction of the machines and their coils. As a matter of interest in this connection, very early in the war Mr. Dalziel met the shortage of arc lamp carbons by a wholesale change-over to 50-volt. metal filament lamps worked from these machines on the same long series circuits, a combination of ancient and modern. The life obtained from these lamps was very satisfactory.

The shop was primarily a repair shop, but manufacture of apparatus and machines not then readily and cheaply purchasable was also undertaken. Automatic switchgear, for example, was then very expensive, and this was a deterrent to pump conversion schemes, many of which were being put forward. It was found possible to make quite suitable switchgear of this type at very reasonable costs. Later a.c. and d.c. motors were constructed on standardised lines.

Apart from cost, which has generally been found to be in favour of the railway shop, the execution of repairs by the railway itself ensures machines, the electrical gear of which has failed, being kept out of service a minimum of time; it enables work to be put in hand forthwith, leaves the railway officers in full control, and eliminates or minimises time of transit to and from the contractor's repair shop. A further advantage which obtained, where railway standardised motors were concerned, was ease of adaptation or substitution of new for broken-down machines including in most cases those of other makes, so that speedy return to service was assured. As the driven machines were often many times more valuable than their electrical parts, and might be key machines, this was of great importance.

Post-war rises in costs, however, made railway manufacture sufficiently non-competitive to neutralise the latter advantages except in certain special cases; the advantages of the railway's carrying out its own repairs, and of its having a staff capable of speedily effecting alterations and modifications, however, remained.

The shop was indeed responsible for carrying out much very important repair and alteration work. For example, as a result of a hydraulic-electric controversy, the lifts at the Midland Hotel, Manchester, were constructed by the contractors in such haste, that in pursuance both of smooth working and reliability, their motors, control and brake gear had soon to be reconstructed by the Derby staff. This work was complicated by the necessity for maintaining the hotel services uninterruptedly, and entailed much all-night work, but there was never any complete failure of lift services. Thereafter the lifts worked for 23 years before replacement.

### Rapid Work by the Electrical Staff

As examples of smart work by the railway electricians, a push-button goods lift ordered urgently for a special let of rental property was designed, constructed and set to work in three weeks. Also supply of current to Derby shops was restored in a day after the bombing of the h.t. mains by a Zeppelin; and when a fire destroyed all the cables between the power station and the shops, interruption of vital supplies to control offices and the station was restricted to eight hours. On another occasion —after immunity from electrical breakdown for many years and throughout the war—the rotors of two of the three turbo-generators in the power station broke down within a week of each other, threatening the major portion of the works with a prolonged shutdown. Yet, in spite of the fact that the electrical shop lacked facilities for such repairs, the repair of the second breakdown had to be, and was tackled at Derby, and the set was got back into work in less than the time that would have been taken in transit to the maker's works.

The repair work of the traction equipments for the electrified Heysham line was also carried out in the Derby shops in Midland days, and indeed, until very recently. Radical reconstruction of these equipments had to be undertaken before they were satisfactory, but the installation is now in its 29th year of operation. A great deal of work on new and converted installations was always in hand.

A further advantage of the railway's doing its own repairs was that, in carrying out modifications of machines, the benefit of experience of working and maintenance could be utilised; such experience also enabled new work to be so specified as to ensure its meeting the requirements of operation and maintenance in the best way.

(*To be continued*)

# AN APPLICATION OF THE BUDGET SYSTEM TO RAILWAYS

## *U.S.A. principles of promoting financial stability and minimising costs*

THE budget, in various forms, is today a constant and essential part of railway accounts all over the world.

The reason for this fact, in which railways differ from nearly all other kinds of industrial undertakings, is the historical development of railway organisation itself. Budgets first came into use on railway systems where the financial management was under direct or indirect

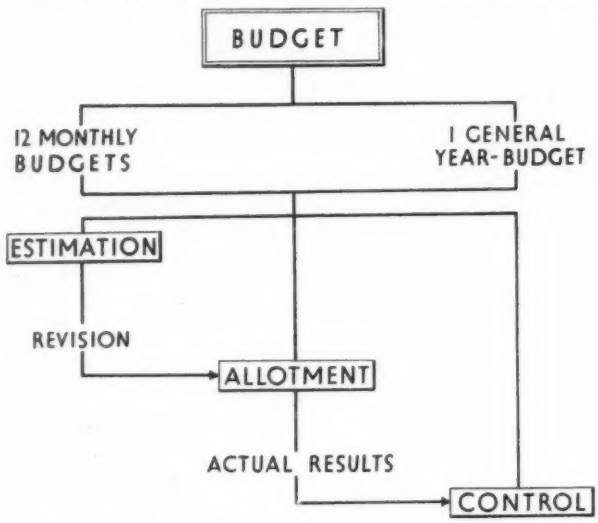



*Fig. 1—Graphical analysis of functions comprised in annual budget*

control of the state. So railway budgets originally were often part of the state budget itself, or became included as rail transport increased. Budgeting, as a practical method of controlling expenditure, has gradually been adopted by private or independent companies which, mainly after the great war, found ways to modify it to suit their individual requirements. Though of the same origin, budgets of private and of state railways today differ considerably from one another, and it must be regarded as to the credit of private railways that their budgets now generally satisfy the requirements of modern scientific calculating methods, while state railways, generally speaking, did not abandon the traditional system of financial accounts.

The modern railway budget is in use most extensively in the U.S.A., and the following description is therefore based largely on American practice. The aim of railway budgeting is to improve financial stability and to minimise costs as far as possible. The system comprises three principal functions:—

1. Estimation of future revenues and expenses.
2. Allotment of forecasts to the several departments.
3. Control of actual results with forecasts.

A budget cannot be considered as complete and systematic if any of these requirements has been omitted. Railway budgets, therefore, must be built up in the same way, and it has always proved advantageous since the days of the first railway financial budgets to carry on this scale of budgeting within the course of one year. This annual budget, however, consists of twelve monthly budgets which are often completed by daily estimates and reports. It is particularly necessary for the railway budget to be subdivided into short periods in order to meet the sharp changes and fluctuations of traffic conditions which can never be forecast exactly for a longer period. Fig. 1 shows graphically the composition of the three budget functions within the budget period.

The modern procedure of budgeting for railways is briefly as follows:—

*Estimation.*—The budget has to compare and balance future expenditures and revenues. It must therefore be regarded as a definite goal of work given in advance to all departments to strive for. This fact makes it necessary for each department, and even each single person, foreman, supervisor, mechanic, and manager, to bear full responsibility for keeping his performance within the limits fixed by the budget. But he cannot be kept under this obligation if he does not have the right to participate in stating the budget figures. This is the reason why estimation, as the first of the three budget functions, must be built up from the point where responsibility and expenditure originate.

There are mainly three groups of operating expenses to be estimated in a railway budget, which, in American terminology, are:—

1. Transportation expenses.
2. Maintenance of way and structure expenses.
3. Maintenance of equipment expenses.

They comprise the following cost elements:—

1. Labour.
2. Material, fuel.
3. Miscellaneous, consisting of interests, dividends, depreciation, duties, etc.

The above are briefly shown in Fig. 2 Estimation of maintenance of way and structure expenses (M.W.S.) and maintenance of equipment expenses (M.E.) generally take

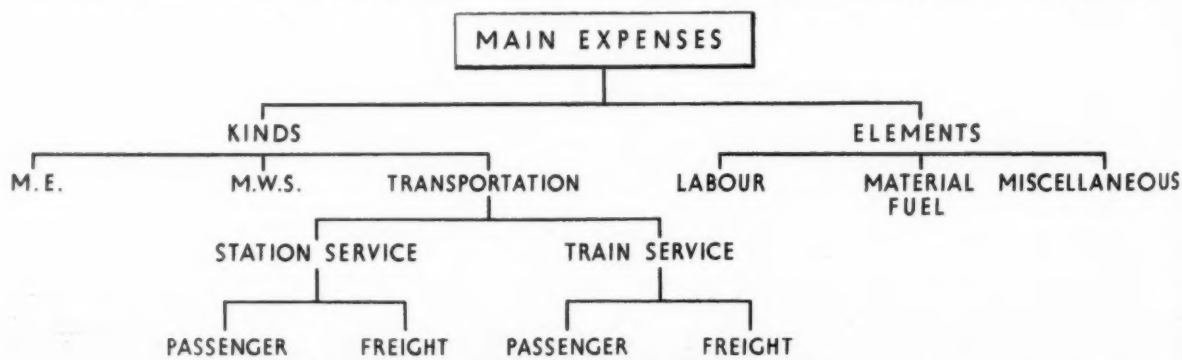



*Fig. 2—The three main groups of operating expenses, and their constituents*

place in departments separated from the regional system and constituted for the railway as a whole. The estimates are based, on the one hand, on fixed or standard items which have been selected as the result of long experience, and, on the other hand, on a knowledge of costs of previous performances. Transportation expenses, however, are estimated by the personal judgment of all the supervisors on the basis of the estimated traffic to be handled and the results and costs of past performance. After a preliminary summary before the beginning of a new financial year, these estimates are repeated monthly and are forwarded to the Central Budget Department about a week before becoming effective for one month. On their way to the Central Budget Department they are constantly corrected and improved by the different superior departments through which they have to pass, and before becoming final budget forecasts, the estimates of the M.W.S. and M.E. departments are added to them. This progress of budget estimates to the final statement is illustrated in Fig. 3.

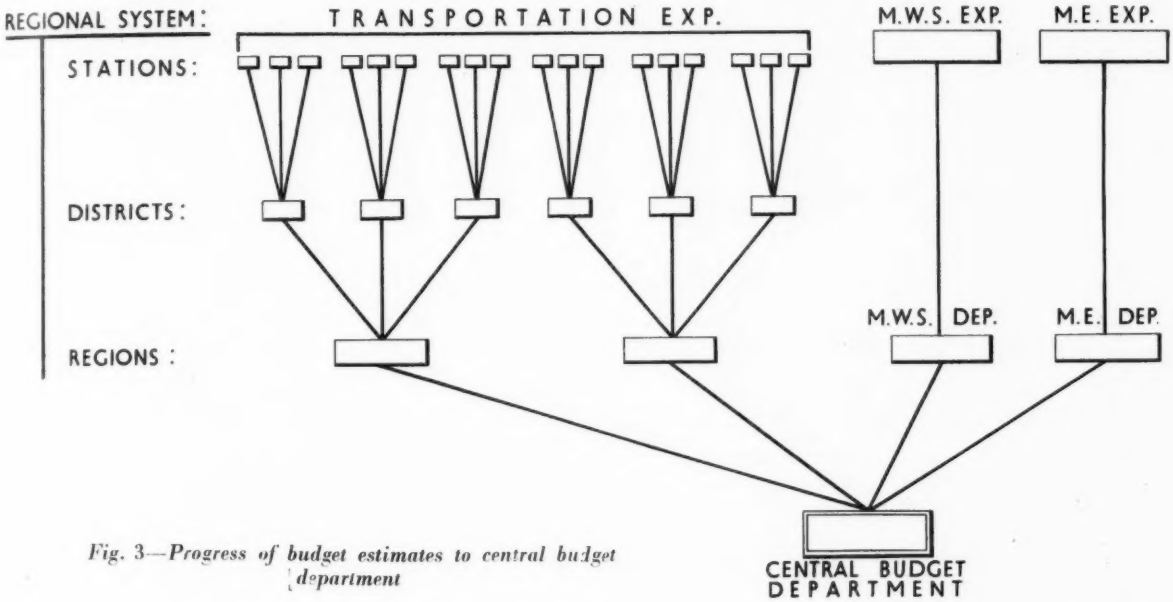



*Fig. 3—Progress of budget estimates to central budget department*

The Central Budget Department now has the task of balancing the estimates arriving from all parts of the system and the revenues expected from the estimated traffic. This revision of forecasts may be considered as one of the most important parts of budgeting. On its successful accomplishment depends whether the budget will be able to take into consideration all sudden fluctuations of traffic. It is often necessary for the forecasts to be reduced or altered entirely according to the circumstances of the moment. Under proper organisation this revision of forecasts is carried on day by day throughout the course of the current budget period by careful controlling.

*Allotment.*—The revised forecasts are now authoritative and go back from the Central Budget Department to the regions and their departments by the same process as shown in Fig. 3. Each department is responsible for keeping its actual expenditure as close as possible to its allotment. Every unavoidable excess must at once be reported to the budget head office, its causes explained, and measures taken to avoid further differences. Allotting the forecasts down to the smallest units of the railway organism has meant that the responsibility of each workman are extended to include a careful watch on the budget limits in force. Budgeting, therefore, has an influence on the care with which the staff discharges its duties.

*Control.*—Budget control begins at once with the final statement and allotment of budget figures. Actual expenditure and revenues are daily, weekly and monthly reported to the Central Budget Department, where they are scanned and where it is stated exactly how much they are in excess of or below the estimates. It has already been mentioned that budget control has to be subject to revision in order to make due allowance for future traffic. This, of course, demands the utmost care in settling actual operating revenues and expenses, in spite of the speed which is necessary to make control results effective immediately. The monthly budgets are controlled continuously throughout the year. The annual budget, however, is checked, both by the monthly control results and at the close of the year, by the balance and the profit and loss account.

Besides this detailed operating budget, railways in all parts of the world possess what is generally called a capital budget. This budget has to control the expense of new construction, new machinery or electrification, the erection of new stations or workshops, and so on.

There are two fundamental attributes of a modern American railway budget—flexibility and completeness. Flexibility makes it possible to meet all abrupt changes of traffic conditions without delay by the co-operation of budget control within short periods and revision of budget forecasts. Completeness means that even the smallest units of the whole organisation of railway management are included in the budgeting programme, so as to be the starting points of estimates and ends of allotments. The purpose of this wide subdivision is to organise expenditure as thoroughly as possible and so secure a better application of budget principles with the definite aim of reducing costs. Flexibility and completeness are consequently the features which distinguish the modern from the traditional financial budget, and allow it to meet adequately the conditions of modern scientific accounts. According to these, a budget, in contrast to all former interpretations of the word, has to become part of the cost accounts, and its forecasts must therefore be looked upon as budget, or standard, costs.

# THE P.L.M. STREAMLINED STEAM TRAIN

## *Reduction in required power through streamlining permits the use of a 30-year-old rebuilt locomotive*

LAST year the P.L.M. began experiments with the streamlining of steam locomotives and at the beginning of 1935 a three-car streamlined train hauled by a streamlined Atlantic locomotive made its appearance, and after numerous tests was set to work on a regular schedule between Paris and Lyons. The trains operated are those leaving Paris (Gare de Lyon) at 8.0 and Lyons at 18.50., which were originally operated by an 800 b.h.p. Bugatti railcar with trailer, known in France as a Bugatti *couplage*. But the traffic developed to such an extent that it was necessary to resort to a steam train.

The Bugatti was allowed a top speed of 140 km.p.h. (87 m.p.h.) and the down run was booked to Lyons in 4 hr. 49 min. for the 511 km. (317·3 miles) including stops at Laroche and Dijon, and 4 hr. 50 min. in the up direction. But as the steam train is not allowed to exceed the French legal limit of 120 km.p.h. (75 m.p.h.) the timing has been increased to 5 hr. 16 min., giving an overall average speed of 97 km.p.h. (60·25 m.p.h.) and a running average of 99 km.p.h. (61·4 m.p.h.).

A 29-year old compound Atlantic of the 221.A class was selected for rebuilding, and in addition to the streamlined casing over engine and tender, it has been provided with one of the latest 48-element superheaters, an A.C.F.I. feed-water heater, mechanical lubrication to the axleboxes and cylinders, and the most improved form of P.L.M. variable blast pipe. An electric lighting installation has been fitted so that the various parts of the mechanism covered by the cowlings can be examined by the driver with the greatest possible facility; the opportunity has been taken of installing electric lights in the cab. Main dimensions of the locomotive other than shown on the accompanying diagram are as follow:—

| | |
|---|---|
| H.P. cyls. .. .. | 340 mm. by 650 mm. (13·4 in. by 25·6 in.) |
| L.P. cyls. .. | 540 mm. by 650 mm. (21·2 in. by 25·6 in.) |
| Working pressure | 16 kg. per sq. cm. (227 lb. per sq. in.) |
| Evap.H.S. (fire-side) | 155·3 sq. m. (1,670 sq. ft.) |
| Grate area .. | 2·98 sq. m. (32 sq. ft.) |
| Superheating surface | 60·42 sq. m. (650 sq. ft.) |
| Adhesion weight .. | 36·6 tonnes (36 tons) |
| Engine weight .. | 75·75 tonnes (74·6 tons) |
| Engine and tender weight .. .. | 143·6 tonnes (141·2 tons) |

The tender fitted to No. 221.A.14 is not the original six-wheeler, but a double-bogie vehicle carrying 30 cu. m. (6,600 gal.) of water and 6·75 tons of coal, so that the locomotive can run through from Paris to Lyons with only one refilling with water, at Dijon. The streamlining of the tender follows the lines of the locomotive, and the top cowling has three holes, one at each side for water and one on the top for coal, all of which are covered by sliding shutters when not in use; these doors are opened and shut from the cab by means of levers.

Three carriages taring 146 tonnes (144 tons) were the original formation of the train, but increased traffic and the desire for restaurant facilities led to the incorporation of a fourth car with dining accommodation and baggage space. The train now tares 201 tonnes (198 tons), and seats 48 first class and 144 second class passengers plus 36 seats in the dining car. Although the four cars are not articulated, they are streamlined as one unit by the provision of rubber connections of full width between the car ends and also between the tender and the leading vehicle.

### Power and Resistance Trials

Numerous trials on the line with the original three-car rake and one of the O.C.E.M. dynamometer cars taring 199 tonnes (196 tons), showed that at a speed of 140 km.p.h. (87 m.p.h.), 550 d.b.h.p. were needed for the haulage when a streamlined Atlantic was in front, and 650 d.b.h.p. when an ordinary engine was at the head; with an ordinary engine and ordinary carriages, 740 d.b.h.p. were required. So far as the first two figures are concerned, some reduction would have resulted if the O.C.E.M. dynamometer car had been streamlined. In all the trains mentioned above, the dynamometer car had plain bearing axleboxes, and the passenger stock S.K.F. roller bearing boxes. According to M. Parmantier, Ingénieur en Chef Adjoint du Matériel of the P.L.M., the resistance, R, in kg. per tonne, of the three trains (not including the locomotive) may be obtained from the following formulæ:—

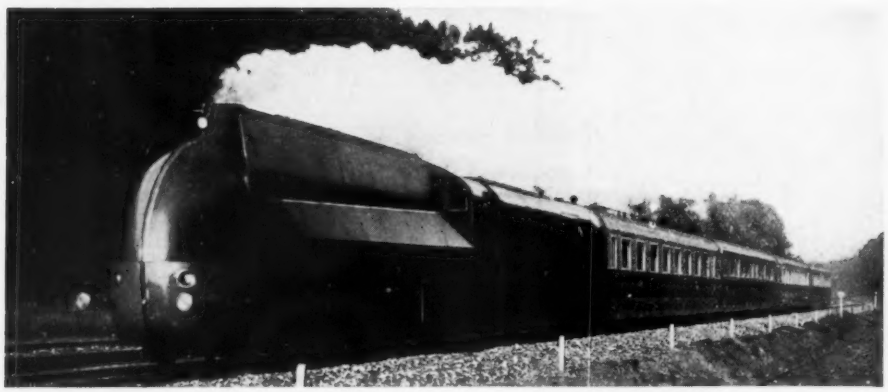
| | |
|---|---|
| Ordinary four-car train when hauled by ordinary locomotive .. .. .. | $R = 1 + 0{\cdot}0017V + 0{\cdot}000302V^2$ |
| Streamlined four-car train when hauled by ordinary locomotive .. .. .. | $R = 1 + 0{\cdot}0017V + 0{\cdot}000259V^2$ |
| Streamlined four-car train when hauled by streamlined locomotive .. .. .. | $R = 1 + 0{\cdot}0017V + 0{\cdot}000210V^2$ |

The indicated horsepower required at 140 km.p.h. (87 m.p.h.) was 1,250 for the streamlined locomotive hauling the streamlined train and 1,700 for an ordinary locomotive hauling an ordinary train; this saving of 450 i.h.p. at 87 m.p.h. was reduced to 280 at 75 m.p.h., the actual indicated powers being 880 and 1,160, and the d.b.h.p. values 375 and 490. During a series of trials on the Paris-Dijon line, the 256·7 km. (159 miles) from Paris to Les Laumes were covered start-to-stop in 144 min. by the ordinary locomotive and train, and in 136 min. by the streamlined set, the average speeds being 66·6 and 70·3 m.p.h. including two p.w. slacks and ten permanent restrictions varying from 120 km.p.h. (75 m.p.h.) down to the 30 km.p.h. from the Gare de Lyon to km. post 0·75. On the return journey, the start-to-stop speeds from Les Laumes to Melun, 212·6 km. (132 miles) were 112·9 and 120·3 km.p.h. (70·3 and 74·8 m.p.h.), but over this distance there are only four slacks (two of them merely to 75 m.p.h.) and two p.w. restrictions, and the line is downhill for over half the distance.

On the series of trials mentioned above the speed did not exceed about 145 km.p.h. (90 m.p.h.) but on further trials with three streamlined cars taring 146 tonnes, the speed rose to a maximum of 156 km.p.h. (96·9 m.p.h.). In the former trials the ordinary train consumed 30½ lb. of coal and 32 gal. of water per mile when running on the easy Les Laumes-Paris section, whereas the streamlined set required only 23 lb. of coal and 24½ gal. of water, or respective economies of 28 and 23 per cent. In each case the evaporation rates were remarkably



*Streamlined steam train (before a fourth car was added) hauled by Atlantic type locomotive No. 221.A.14, Paris, Lyons & Mediterranean Railway*



*P.L.M. streamlined train headed by 221.A.11 in the Forest of Fontainebleau*

high. On this basis the streamlined set will save 250 tonnes of coal a year on a distance of 100,000 km. (62,000 miles).

Through the kindness of Monsieur R. Vallantin, Ingénieur en chef de Matériel et de la Traction of the P.L.M. Railway, we recently made a footplate trip with the regular four-car train. Although the engine was worked very easily most of the way, the schedules were slightly improved upon, despite a p.w. check to 52 km.p.h. (32 m.p.h.) between Paris and Laroche and another to 22 km.p.h. (14 m.p.h.) for 45 sec. between Laroche and Dijon on a 1 in 133 grade. The 132-km. (82-mile) rise from Laroche to Blaisy-Bas, the average for the first 100 km. (62 miles) of which is 1 in 660, and for the remainder 1 in 233-125, was topped at a minimum of 85 km.p.h. (52·8 m.p.h.); the speed up the lower part of the bank varied from 105-120 km.p.h. (65 to 75 m.p.h.), and after the check to 22 km.p.h. (14 m.p.h.) between Aisy and Montbard rose to a maximum of 105 km.p.h. (65 m.p.h.) at Thenissey. The 155 km. (96·2 miles) from the Gare de Lyon to Laroche were covered in 93 min. 57 sec., 2 min. under schedule, and the 159·5 km. (99·0 miles) thence to Dijon in 95 min. 16 sec., although speed on the 26-km. (16-mile) descent from Blaisy-Bas to Dijon did not exceed 112 km.p.h. (69·6 m.p.h.) and for most of the way downhill kept at 105-107 km.p.h. (65-66 m.p.h.).

The nominal working pressure of 16 kg. per sq. cm. (227 lb. per sq. in.) was rarely attained, 15 kg. (213 lb.) being more than sufficient for the work required. Only on the last stages of Blaisy-Bas bank and when accelerating from slacks was the regulator more than half open; along generally level and slight uphill sections, half regulator and 50-52 per cent. cut-off in the h.p. cylinders were sufficient to maintain 65-75 m.p.h. Under these conditions the pressures in the boiler, steam chest, and intermediate reservoir averaged respectively 15/13¼/2 kg. per sq. cm. (213/188/28 lb. per sq. in.). With 66 per cent. h.p. cut-off and nearly two-thirds regulator on the last stages of Blaisy-Bas bank, the reading was 12/11½/2·1 kg. per sq. cm. (171/163/29 lb.). Despite the 48-element superheater the temperature of the steam did not exceed 320° C. and was maintained at 310-320° C. for most of the run. The streamlining of the locomotive was most effective in keeping the steam clear of the cab. The exhaust was kept in a stream along the centre line of the locomotive and neither came down over the train nor splayed out to the sides.

A second Atlantic of the same class has been rebuilt and streamlined in order to act as reserve for No. 221.A.14, but with the inauguration of the summer timetables in 1936 it is expected that a further six streamlined Atlantics and at least two four-car streamlined trains will be put into service between Paris, Marseilles, and the Riviera, at an overall running speed to Marseilles of 105 km.p.h. (65 m.p.h.). The train will leave Paris about midday and long-distance passengers will reach their destination at a relatively early hour the same night.

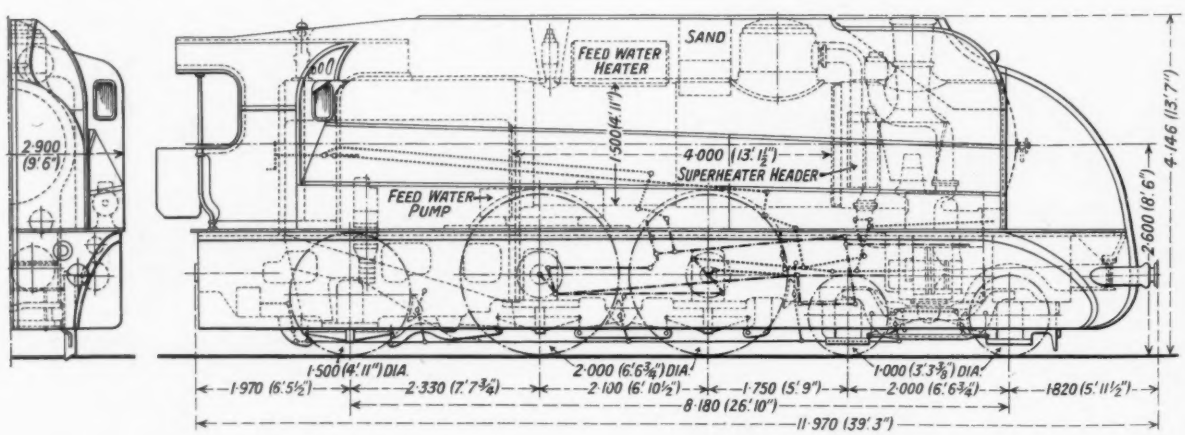



*Diagram of P.L.M. streamlined Atlantic working over the Paris-Lyons division*

# RAILWAYS AND ROAD TRANSPORT SECTION

*This section appears at four-weekly intervals*

## Horse *versus* Motor

THAT motor vehicles have proved their capability for efficiently performing a considerable proportion of the growing road transport work that has to be carried out by the railway companies is amply shown by the large fleets at present employed, and the substantial orders for them that continue to be placed. The fact remains, however, that during the five years to December 31, 1934, while the number of motor vehicles employed in parcels and goods service by the four group railways, increased from 4,313 to 7,655, the number of horses employed in a similar way decreased only from 17,364 to 13,786, and the number of vans and carts fell from 31,999 to 30,940.

To many minds it may seem strange that the stock of horses in railway service should remain so high, and it is urged, on behalf of the railways, that so far the motor manufacturers have not put forward a vehicle that can do the work these horses are doing, mainly in collection and delivery, so much more efficiently as to justify a change-over. It is all the more surprising because a number of new types of motor vehicles have been evolved mainly for railway work, and their advantages have led to their adoption by other concerns with similar transport problems. The forward control style of vehicle with its increased space for the load was one example, and a still more striking instance was the production of the motor cob or mechanical horse, a unit of unconventional design which has demonstrated its usefulness in many other departments of industry, apart from railways.

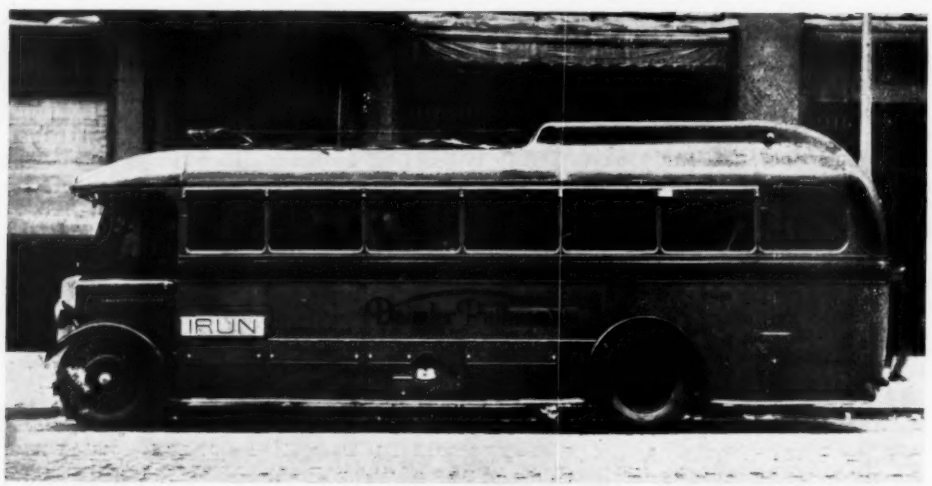
It would seem that if these horses are to be displaced, it is most likely to come about through the production of a vehicle designed to meet the special conditions. The way in which those conditions, mainly through the many stops that have to be made in the course of a short journey, conspire to nullify the advantage of speedy travel which the motor vehicle possesses was strikingly brought out in the lecture on The Mechanisation of Railway Goods Depots delivered at the Institute of Transport on December 17. In the first portion of the lecture, Mr. E. Falconer, of the L.M.S.R., dealing with cartage, gave the results of some carefully timed tests which show the pernicious effect of the stops and delays. It is an aspect of the problem that has been stressed at a number of the conferences held during the Commercial Motor Transport Exhibitions at Olympia. Mr. Falconer, however, gave chapter and verse, and elsewhere in this issue his tables and notes are reproduced, and we feel sure that they will be closely studied by those automobile engineers who are facing up to the problem of producing a vehicle specially suitable for collection and delivery work.

It is a field which extends far beyond railway service. A vehicle which demonstrated its entire suitability for such work certainly would quickly attract the attention of traders who are continuing to use horses for much the same reasons as the railway companies put forward, and be bought by them.

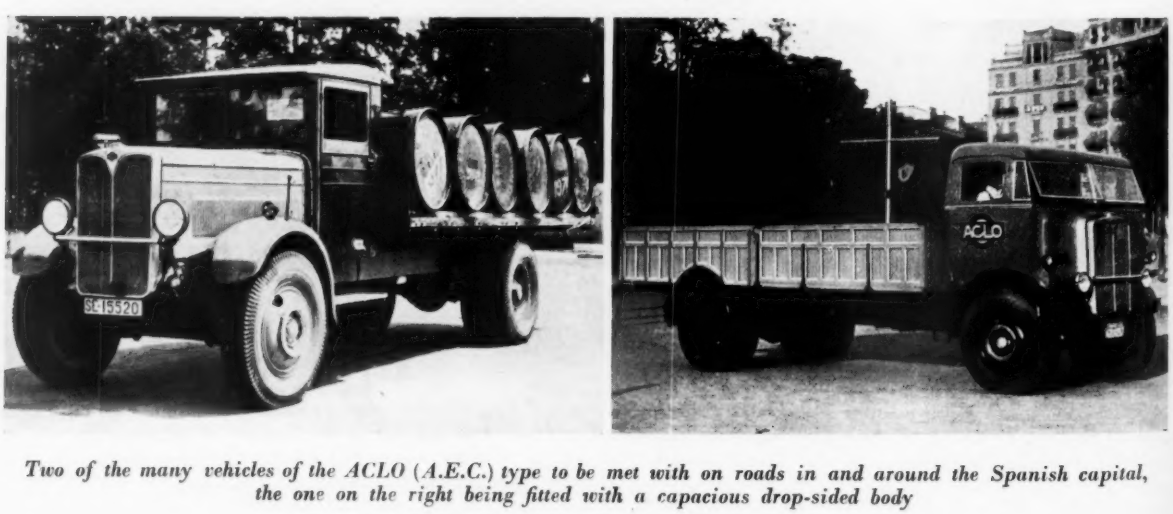

*One of the A.E.C. Regal oil-engined buses employed by the Isle of Man Road Services Limited, a subsidiary of the Isle of Man Railway Company, on its network of routes linking up the towns and villages in the Island. It is here seen beneath Castle Rushen at Castletown, once the Manx capital. During the summer season this vehicle, which has coach type seats and fittings, is frequently used for private hire work*

# Road Transport in Spain


*Two examples of modern transport in country districts in Spain, the picture on the right showing a typical mail-passenger coach running between small towns*




*One of the latest type Daimler Pullman coaches that are maintaining regular services between Madrid and the French frontier at Irun with stops at Burgos, Miranda, Vitoria, and San Sebastian*




*Two of the many vehicles of the ACLO (A.E.C.) type to be met with on roads in and around the Spanish capital, the one on the right being fitted with a capacious drop-sided body*

# Road Transport in Spain

***Some illustrations of the changes which are taking place in Spain in the transport of goods and passengers and the influence exerted by road improvements in increasing the use of motor vehicles***

THE gradual substitution of old methods of transport by modern motor vehicles that has been taking place all over the world has been particularly marked in Spain. This is borne out by the number of photographs reproduced in this issue, bringing out several aspects of both passenger and goods transport. One contrast that is specially effective is that between the old diligence which before the war ran daily between Granada and the surrounding villages and the modern Daimler Pullman motor coach which, fitted with bar, lavatory, and other up-to-date refinements, now carries passengers between Madrid and the French frontier at Irun. The passenger vehicles, however, are not all of the luxury type as can be seen from the picture of one of the motor mail coaches running between the small towns in country districts. In Madrid itself the visitor from London would recognise the double-deck buses for they are of the familiar design and supplied by the Associated Equipment Co. Ltd. In Barcelona and other places there are likewise modern British-built buses on regular services.

Other photographs also bring out the difference between the old country cart and its team of mules, with a donkey at the head, and the various types of lorry, among which the ACLO (A.E.C.) types are frequently to be noticed, as this make has shown its suitability for the conditions pertaining in Spain.

This revolution in transport has been rendered possible only as a result of the improvement in the construction and maintenance of Spanish roads, which may now be reckoned among the best in the world. There are about 87,000 km. of roads in the country of which 58,000 km. are State highways and it may be recalled that in 1933 nearly 200,000,000 pesetas were set aside for road upkeep and development of which 47,000,000 pesetas was for new construction and 30,200,000 pesetas for the special metalled roads. (*Peseta = 36¼ to £ at current rate.*)

Yet motor transport goes forward slowly, for the taxation is heavy and there are various restrictions made in the endeavour to secure co-ordination between railway and road transport. Recent statistics indicate that there are about 6,500 motor buses and about 66,000 goods vehicles licensed, numbers which show an increase of about 20 per cent. during the past four years. The taxes are many and various. There is a vehicle tax, working out to round about £1 per horsepower; the transport tax, which is on an onerous scale; the road maintenance fee; stamp duty on tickets and waybills; petrol tax; while passenger vehicles also have to pay a vehicle inspection tax. In those circumstances it is perhaps a little surprising that so much road transport progress has already been achieved.

***The old method in Spain. On the left is seen one of the old country carts of about 20 years ago while to the right is the old diligence with its mule team which used to run between Granada and the neighbouring towns***

As an example of the road making work that is being carried out a few particulars may be given of the new road from Granada which is being constructed with the object of developing the Sierra Nevada in the South of Spain as a touring centre and to shorten the journey to Almeria and the Mediterranean by 50 miles. At present the road runs 26½ miles from Granada to the Pic Veleta, 11,246 feet above sea level and 2,000 feet higher than any other road in Europe. Eventually, however, travellers will not have to go to the summit, as at 10,006 feet they will drive under the Pic through a tunnel, 1,312 feet long, and then along a road, now under construction, to Almeria. Only 2¾ miles of this latter part of the road has been completed but it is hoped the highway will be finished within the next two or three years. Already over five years have been spent on the project but it must be remembered that it is only possible to work on the higher slopes during four months of the year owing to the intense cold. So far the cost has been round about £110,000 and it is estimated that another £50,000 will be required to finish off this 45·9 miles road.

# New Carter Paterson Depot at Surbiton

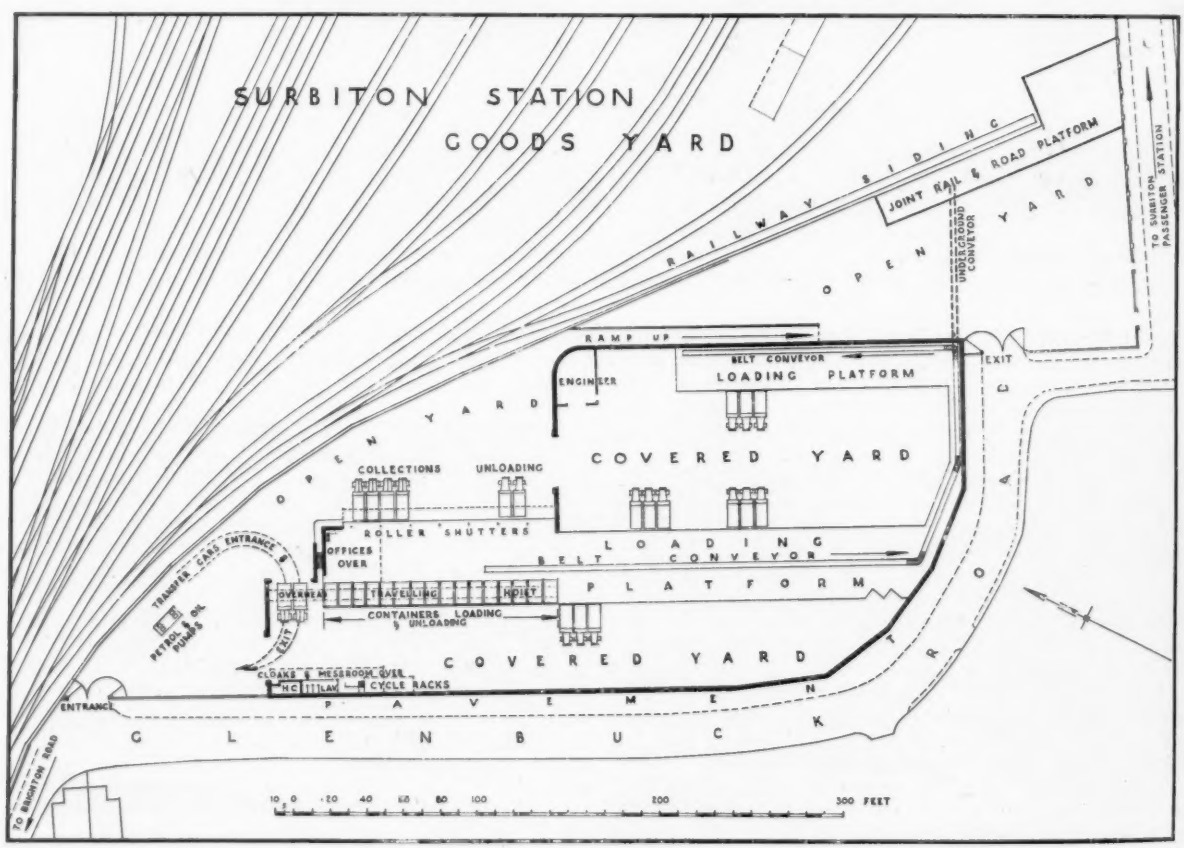
*Adjoining a Southern Railway main line station, this latest Carter Paterson depot, with its modern system of handling traffic, affords an easy means of exploiting the possibilities of road and rail co-ordination*

AN installation of the latest mechanised conveyor system for distributing the packages, the use of containers for inter-depot traffic, and a direct physical connection with the railway, are outstanding features of the new Carter Paterson depot at Surbiton. It is an all-motor depot, with no provision for horses, and it takes the place of the depot at Norbiton, originally designed for horse transport and altered to render it suitable for motors in 1913, but which is not now large enough for the great expansion of traffic that has followed the vast increase in the population in recent years in the districts surrounding Kingston that were served from it. The new depot is in Glenbuck Road, Surbiton, adjoining Surbiton station and goods yard, where the depot will have a siding with platform, which will be directly connected by an underground conveyor to the conveyor on the distributing platforms.

With a pleasing modern exterior, the new depot has been designed on clear cut lines, having spacious yards, free of obstruction of any kind, and providing on the site of nearly 2½ acres a greater covered area than has previously been obtained in a Carter Paterson depot. Working conditions will thus be as congenial as possible in both summer and winter, and the motor vehicles will be under cover in cold weather.

From the plan it will be observed that there are two platforms in the depot, and an idea of the size of the establishment can be obtained when it is stated that the main one is 350 ft. long by 40 ft. wide, while the secondary one is 150 ft. long by 25 ft. wide. Both are served by mechanical conveyors for almost their entire length, thus avoiding the use of trucks.

In the normal way the traffic arrives either in containers from other depots or in vans that have collected it in the districts round the depot. The process of unloading is simple and speedy. Vehicles entering the yard carrying containers make a wide sweep, and drive under the western end of the depot to stop beneath the 5-ton travelling hoist, by Pickerings Limited, which quickly transfers the container to the platform, and replaces it by one that is already loaded for transfer. By this means vehicles and traffic are kept on the move, and no time is lost to the




*A sketch plan which shows the general lay-out of the new Carter Paterson depot, adjoining Surbiton (S.R.) station. It has the largest covered area of a Carter Paterson depot and the distribution of the packages is effected by conveyor belts*


*This shows an incoming container being lifted from the lorry for transfer by the hoist to the unloading bank. The hoist will then place a loaded container on the vehicle*

service by vehicles having to wait until their containers are loaded. On the main platform, space for 16 containers has been provided. The conveyor is extended to those containers which are being unloaded; thus the incoming traffic is quickly transferred to the appropriate loading docks. Opposite the containers is " backing-up " space for the vehicles that have made collections. It will be seen, therefore, that all incoming goods arrive at the same end of the platform, and are sorted and transferred either to an outgoing container or on to the conveyor belt for distribution to the delivery vans.

Space for loading delivery vans commences at the end of the travelling hoist on one side of the platform, and just within the covered yard, as shown on the plan, on the other. Altogether provision has been made for loading 66 district delivery vans, 48 of these being on the main platform, and the remainder on the secondary. The secondary platform is single sided and parallel to the main platform, to which it is connected by the conveyor belt. On this platform the conveyor has been placed against the wall, whereas on the main platform it is, naturally, in the centre, so that packages may be distributed to either side.

The conveyors used are of the sliding belt type; that is to say, a continuous balata band sliding on steel plates with rollers at intervals. To avoid unnecessary labour, the belt is raised a distance of only a few inches above the floor of the platform. An additional feature is the hard wood slide which enables the goods to be pulled off the belt at the ends or intermediate places, without any shock. The transfer of traffic from one conveyor to another is done by means of gear graduated, power operated, rollers, which are capable of transferring anything from a pocket handkerchief to a 30-cwt. casting without the likelihood of damage to either the package or the belt.

The fact that the company has a railway siding included in this new depot is important, as it will form part of the road-rail co-ordination schemes, and when the depot is completed one of its most interesting pieces of equipment will be the underground conveyor connecting the siding platform with the main conveyor system on the distributing platforms. In addition to these facilities for mechani-


*In this view the container brought by the lorry is being lowered in a space opposite the conveyor belt, in order that the traffic can be transferred with a minimum of delay to the loading bays. When empty the container is shifted to the left where it is in the best position to be re-loaded from the incoming collection vans*

cal transfer, there will be space at the siding platform for vehicles to be backed up to collect or deliver direct loads, the intention being to obviate double handling. In all, there will be 687 ft. of conveyors; Surbiton, being the eighth depot where the handling of the traffic is mechanised, embodies the experience gained in the other depots.

The natural and artificial lighting arrangements are conspicuous. In the daytime light comes through the windows in the roof, and in the walls of the building, so that even on the dullest days the platform is as light as weather conditions will allow. For the hours of darkness, a large number of electric lights have been arranged at short intervals throughout the length of the platform, special reflectors being used to obtain a maximum of light where it is most needed. The excellent lighting accentuates the light blue colour that has been used for painting the steelwork, &c.—this colour was selected to assist in the reflection of natural light, and to present an effect that is pleasing and comfortable. At the same time the principle destroys the generally accepted opinion that a carriers' depot must of necessity be a drab and completely colourless structure, calculated, by reason of its very severity, to give an impression of cold efficiency.

Above the western end of the main platform is the Superintendent's office, enabling him to see the work that is being done on that platform from one end to the other, and adjoining it is an office for the clerks, whilst opposite are spacious mess rooms, cloakrooms, and other accommodation for the staff including cycle racks, as indicated on the plan on page 114.

# Two-Class Buses for Egypt

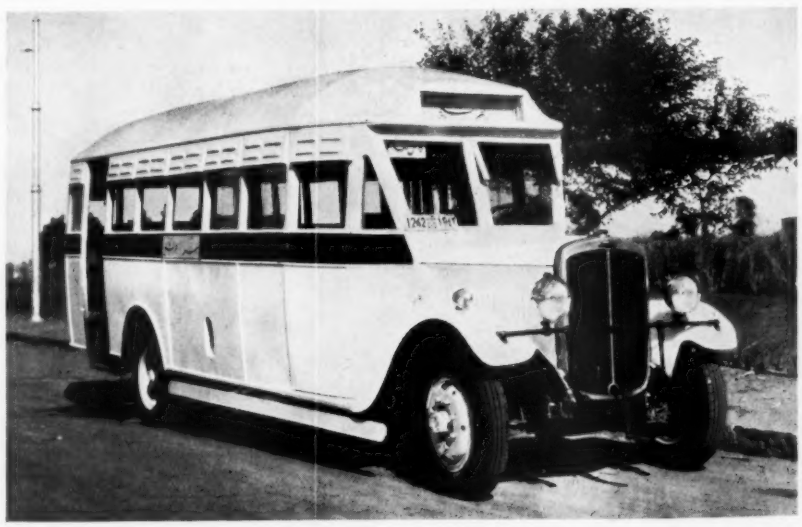
***Details of some interesting vehicles being put into service in conjunction with the Egyptian State Railways***

THE photograph reproduced on this page illustrates one of a fleet of twenty-four single deck buses for accommodating two classes of passengers, that is being placed in service to supplement the facilities offered by the Egyptian State Railways. The chassis used is of Thornycroft make, of the Lightning class with the 16 ft. wheelbase, while the special bodywork has been designed and manufactured in the railways' workshops. The arrangement of the saloon has been evolved so as to provide two separate compartments for European and native passengers, each class having its own entrance, the former being accommodated in the front part which has a full coach door and upholstered seats in pairs, whereas the native class use the open entrance at the rear.

The Lightning class of Thornycroft chassis has been developed for public service vehicle work of this nature. It has a six-cylinder overhead valve petrol engine of 3½-in. bore by 4½-in. stroke giving a total capacity of 259·7-cu. in. and developing up to 75 b.h.p. The customary three-point suspension is used with rubber bushes to prevent any stresses due to frame distortion reaching the crankcase. Through a single plate clutch of large diameter and a four-speed gearbox the drive is transmitted to a full floating back axle carrying disc wheels with twin 7·50-in. by 20-in. low pressure tyres. The alloy steel springs are fitted with the Thornycroft patent type of relieving plate which enables the holding down bolts to withstand the stresses due to flexing of the springs without suffering undue elongation. It may be remembered also that in order to relieve the central bolt of shear stress, which would otherwise be caused by horizontal forces due to driving and braking, the holding-down bolts are inclined to each other, and special ears are provided on the top leaf to grip them. The main chassis frame is of pressed alloy steel of deep channel section, with channel type cross-members with wide gussets placed to give an extremely rigid construction without employing excessive weight of material.

The steering wheel is on the left hand side while the steering gear is of the worm and wheel type with a complete worm wheel so that a fresh sector may be brought into use should backlash develop through wear. The footbrake, assisted by a powerful vacuum servo, operates shoes in 17-in. drums on all four wheels and the hand brake similarly affects all wheels. All the brake gear is easily accessible and adjustable, while the facings consist of large fabric pads, ensuring long life with a minimum of adjustment. The brakes are enclosed by dust covers. The mechanical equipment of these vehicles is quite comprehensive and includes a tropical type radiator, electric starter, mechanical tyre pump and two spare wheels with each vehicle.

This type of chassis is fitted with a 12-volt constant voltage lighting set (suitable for any number of interior lights, provided all lamps do not exceed a total of 200 watts), double filament anti-dazzle bulbs in head lamps, two wing lamps, combined tail lamp and stop light, 105 amp. hour battery, electric horn, and electric starter.



*One of the new Thornycroft buses, with Egyptian-built bodies, working services in connection with the Egyptian State Railways*

# Mechanisation of Railway Goods Depots

IN the lecture under the above title given at the Institute of Transport on December 17, the first part, on cartage, was delivered by Mr. E. Falconer who, after briefly reviewing the way in which the railway companies have been extending their use of motor vehicles, and some of the changes in the design of the vehicles that have taken place to fit them more adequately to railway needs, discussed the disabilities which are preventing the wholesale adoption of motor vehicles for the collection and delivery of general merchandise. He pointed out that the bulk of the tradesmen want their parcels delivered first thing in the morning, but on the other hand require the collection of their own particular traffic to be left until the last possible moment in the evening. Apart from the difficulties caused thereby, Mr. Falconer emphasised that the factor which has more influence than any other in the comparative economic merits of horses and motors is the proportion of time the units are standing as compared with the time they are actually running.

Mr. Falconer said that a superficial consideration of the matter might lead to very misleading conclusions as to the value of the higher speed of the motor, probably to some extent due to the psychological effect of the fact that mechanical units are generally observed only when they are actually running. When, however, not more than 30 per cent. of a vehicle's time is occupied in running, or approximately 3 hours a working day of 8½ hours, if a motor is taken as being three times as fast as a horse it will be seen that the motor can gain only 2 hours a day over the horse, and is thus equal in performance to less than 1¼ horses, while the motor cost is considerably in excess of that proportion.

Actually, Mr. Falconer suggested, to work on an average speed of a motor as being three times as fast as a horse might be unduly flattering to the motor on a cartage round entailing many stops and starts. The effect of stopping and starting, mounting on and dismounting from vehicles, and the result of traffic delays on the average speed, needed to be measured accurately before a reliable comparison could be made between horse and motor units and, if this was done, the result might be found to be surprising.

In the case of horse teams the man was generally already on the ground in position for starting delivery, and closely observed measurements showed that under varied conditions the horse speed remained fairly constant. This was due to the horse stopping within approximately its own stride, and starting with an initial urge into its normal pace. With the motor, for every stop made the motorman had to decelerate, put on the brake, switch off the engine, and climb down. After making the delivery the driver must restart the engine, and even after getting back to his seat must work up from low gear before gaining his higher speed advantage. The effect of dense traffic, traffic lights, &c., was also more unfavourable to the motor than to the horse.

Tests show that the approximate time for a motorman dismounting from and mounting to his seat was 30 sec. per call over the horse time. From accurately timed tests which have been carried out, the following data had been compiled:—

VARIOUS UNITS TRAVELLING OVER A TWO MILE ROUTE (ONE MILE OUT AND ONE MILE HOME) WITH VARYING NUMBER OF STOPS, BUT WITH SAME PAY LOAD

| Unit | No. of stops | Total travel time | M.p.h. |
|---|---|---|---|
| 2-ton motor ... ... | 5 | 11 min. 11 sec. | 10·70 |
| Fast horse, walking | 5 | 30 min. 23 sec. | 3·97 |
| Slow horse | 5 | 40 min. 30 sec. | 2·96 |
| Trotting horse ... ... | 5 | 22 min. 43 sec. | 5·30 |
| 2-ton motor ... ... | 15 | 19 min. 26 sec. | 6·02 |
| Fast horse ... ... | 15 | 29 min. 55 sec. | 4·02 |
| Slow horse ... ... | 15 | 37 min. 14 sec. | 3·22 |
| Trotting horse ... ... | 15 | 26 min. 49 sec. | 4·50 |
| 2-ton motor ... ... | 25 | 27 min. 07 sec. | 4·4 |
| Fast horse ... ... | 25 | 30 min. 13 sec. | 3·98 |
| Slow horse ... ... | 25 | 40 min. 42 sec. | 2·97 |
| Trotting horse ... ... | 25 | 30 min. 51 sec. | 3·90 |

The results showed that the variation in the number of calls made little, if any, difference to the overall pace of the walking horse, but a very marked difference in the speed of the motor, and with 25 stops the average speed of the motor was very little in excess of that of the fast horse. The trotting horse showed a slight variation, as the carter has to dismount from his dray, and allowance had been made for this in the figures quoted.

To give some indication of the effect of these factors when applied to actual practice, the calculations set out in the table below were given by Mr. Falconer who, earlier in the lecture, had stated that it might fairly be assumed that the time occupied in loading or unloading goods at the firm's premises, and the time occupied in obtaining disposal instructions, or signing for the goods,

| | Horses | | | | | | | Motors | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Trotting Available working | | | | Walking day = 460 min. | | | Available working day = 470 min. | | | | |
| *Five calls* | | | | | | | | | | | | |
| No. of journeys ... | 5 | 6 | 7 | 8 | 5 | 6 | 7 | 6 | 7 | 8 | 9 | 10 |
| | min. | min. | min. | min. | min. | min. | min. | min. | min. | min. | min. | min. |
| Stn. detention... ... | 100 | 120 | 140 | 160 | 100 | 120 | 140 | 120 | 140 | 160 | 180 | 200 |
| Travelling time ... | 114 | 136 | 159 | 182 | 153 | 183 | 214 | 67 | 78 | 89 | 101 | 112 |
| Delivery time* ... | 75 | 90 | 105 | 120 | 75 | 90 | 105 | 90 | 105 | 120 | 135 | 150 |
| TOTAL ... ... | 289 | 346 | 404 | 462 | 328 | 393 | 459 | 277 | 323 | 369 | 416 | 462 |
| *Fifteen calls* | | | | | | | | | | | | |
| No. of journeys ... | 3 | 4 | 5 | | 3 | 4 | 5 | 3 | 4 | 5 | 6 | — |
| | min. | min. | min. | | min. | min. | min. | min. | min. | min. | min. | |
| Stn. detention... ... | 60 | 80 | 100 | | 60 | 80 | 100 | 60 | 80 | 100 | 120 | |
| Travelling time ... | 80 | 107 | 134 | | 90 | 120 | 150 | 59 | 78 | 98 | 117 | |
| Delivery time* ... | 135 | 180 | 225 | | 135 | 180 | 225 | 135 | 180 | 225 | 270 | |
| TOTAL ... ... | 275 | 367 | 459 | | 285 | 380 | 475 | 254 | 338 | 423 | 507 | |
| *Twenty-five calls* | | | | | | | | | | | | |
| No. of journeys ... | 2 | 3 | 4 | | 2 | 3 | 4 | 2 | 3 | 4 | | |
| | min. | min. | min. | | min. | min. | min. | min. | min. | min. | | |
| Stn. detention ... | 40 | 60 | 80 | | 40 | 60 | 80 | 40 | 60 | 80 | | |
| Travelling time ... | 62 | 93 | 123 | | 60 | 91 | 121 | 54 | 81 | 108 | | |
| Delivery time* ... | 150 | 225 | 300 | | 150 | 225 | 300 | 150 | 225 | 300 | | |
| TOTAL ... ... | 252 | 378 | 503 | | 250 | 376 | 501 | 244 | 366 | 488 | | |

* At 3 min. per call

would be the same both for motors and horse teams.

In these calculations the same allowance for standing time had been made in each case, horses and motors, *i.e.*, 3 minutes for each call and 20 minutes station time each journey. The distance covered had been taken as two miles (one mile out and one mile home).

*Five Calls.*—The good walking horse could get 7 trips a day. The trotting horse 8 trips a day and the motor 10 trips a day. In each case the work would be done in almost identical total time. The motor was capable of approximately only 0·25 more work daily than horse teams over this distance and with 5 calls, yet the cost would more nearly approximate two horse teams.

*Fifteen Calls.*—Trotting and walking horses could perform 5 journeys a day against 6 by the 2-ton motor. The trotter would carry out the work within the normal available day; the walking horse driver would require 15 minutes overtime and the motorman 37 minutes overtime.

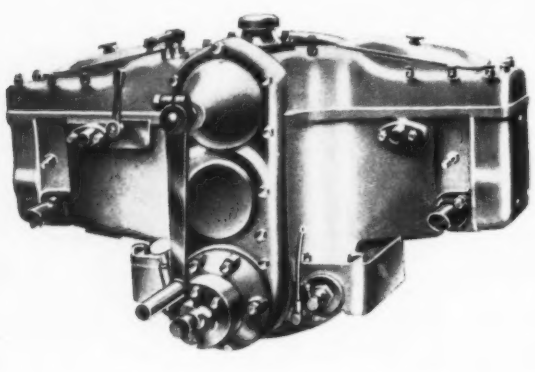
*Twenty-five Calls.*—All units balanced on 4 journeys, the horses in almost identical time, incurring overtime of approximately 40 minutes each, the motor incurring 18 minutes overtime. If, however, the station time, or the time standing at the firm's premises, should exceed those adopted for the calculations, the results would be still more favourable to horse working.

In the second part of the lecture Mr. A. E. Hammett dealt with barrowing, and after considering some of the modern equipment in the way of hoists and conveyors, suggested that work would be speeded up if iron tyred hand barrows were replaced by modern types with rubber tyres and ball bearings in the wheels.

## Small Oil Engine for Road Vehicles

RECENTLY there was demonstrated in London a chassis suitable for carrying a van body for loads of about 15 cwt. which was unique in that it was fitted with a new type of high-speed oil engine. This power unit has been developed by Victor Oil Engines Limited, and it has two cylinders horizontally opposed, the bore being 80 mm. and the stroke 100, with a combined capacity of 1,000 c.c. It works on the four stroke cycle with a solid injection air cell in the cylinder head, the fuel being injected by two C.A.V.-Bosch pumps operated directly off camshaft and delivering by short pipes to special pintle type non-choking nozzles, pumps and nozzles being enclosed but instantly accessible.

Our illustration shows the general compactness of the engine. The cylinders have easily removable liners of special iron while the pistons are of aluminium with three



*A general view of the Victor oil engine for light vans and similar work*

compression rings above the gudgeon pin and a scraper ring in the skirt. Valves are of special alloy steel, overhead, with double return springs actuated by rockers and push rods, all the valve gear being pressure lubricated. The crankshaft is of a built-up type developed by the firm. It has two throws with robust crankpins and crankends, and runs on two oversize roller bearings, with a large deep row ball locating bearing in addition. The engine will start from cold, a clockwise turning handle being geared to half engine speed. There is a quick release decompressor device with sliding exhaust valve cam. A 12-volt electric starting equipment can be fitted with its control and that for the decompressor on the instrument panel.

A short demonstration run on a chassis fitted with one of these engines showed that it was quite tractable and could be driven in London traffic without the slightest difficulty, the pulling power being especially noticeable at low speeds, while the acceleration was quite good. There was no perceptible smoke from the exhaust and the engine was quiet in operation.

## German Motor Highways in 1935

THE preliminary report of the activities of the Board of the German National Highways, or *Reichsautobahnen*, for 1935 shows that the work of construction has been steadily pushed forward. The following sections were opened for traffic :—

| | | |
|---|---|---|
| May 19 | Frankfort (Main) to Darmstadt | 22 km. (13·67 miles) |
| June 29 | Munich to Holzkirchen .. | 25 km. (15·53 miles) |
| Oct. 3, | Darmstadt to Heidelberg, via Mannheim .. .. | 61 km. (37·90 miles) |
| | Total .. .. | 108 km. (67·10 miles) |

Inclusive of the sections in progress on December 31, 1934, work was pursued on a length of 1,876 km. (1,166·56 miles) in 1935, at the end of which year about 3,450 km. (2,143·73 miles) had been planned and the specifications and contracts arranged.

In the previous year work had been mainly on earthworks, embankments, &c., but in 1935 the actual road surfaces were extensively completed, in doing which the experience gained with the first sections proved most valuable. In July the number of contractor's workmen employed was 113,139.

The number of bridges on the new highways is very large, as every effort has been made to avoid level crossings, both with other roads and railways. There is a bridge of some kind about every 800 to 1,000 m. (874·9 to 1,093·61 yd.). As the roads are some 24 m. (26·25 yd.) wide, the work involved is considerable. Great care has been taken to make pleasing structures in harmony with the surroundings. Large quantities of steel, concrete, reinforced concrete and stone have been used. At the beginning of 1935, for example, 7,300 tonnes of steelwork had been installed, and about 55,000 tonnes ordered. The latter figure rose to 137,000 tonnes at the close of the year. Eight hundred bridges have been built and 600 more have been begun.

The financing of the work has been done by the Reichsbank through the German Transport Credit Bank, and the National Highways Necessities Company.

# RAILWAY NEWS SECTION

## PERSONAL

L.N.E.R. Appointments

Mr. G. Sutherland, Assistant Accountant, has been appointed Chief Accountant in succession to Mr. C. H. Newton.

Mr. R. Brown, Assistant to the Chief Accountant, has been appointed to succeed Mr. Sutherland as Assistant Accountant.

Mr. G. H. Skelton, Chief Book-keeper, has in turn been appointed Assistant to the Chief Accountant, and Mr. F. H. Sedgwick Chief Book-keeper.

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Mr. Sutherland began his railway career in 1895, at Inverness, in the Audit Office of the former Highland Railway, and from 1905 to 1913 he was in charge of the Locomotive Accounts under the Accountant. In the latter year he was appointed Examiner of Departmental Accounts under the General Accountant of the former North British Railway. From January, 1920, to January, 1921, Mr. Sutherland's services were lent to the Ministry of Transport as Accountant to the Director-General of Civil Engineering, but he then returned to Edinburgh, where he remained until, as a result of the amalgamation, he was transferred to London in March, 1923, as Special Auditor under the Chief Accountant, L.N.E.R. In May, 1925, he was appointed Assistant to the Chief Accountant and three years later became Divisional Accountant, Southern Area. It was in July, 1928, that Mr. Sutherland succeeded Mr. C. H. Newton as Assistant Accountant.

Following the retirement of Colonel F. A. Cortez Leigh and the reorganisation of the Electrical Department of the L.M.S.R., Mr. J. Dalziel, who was Assistant Electrical Engineer, recently retired from the service. Mr. Dalziel was educated at George Watson's College, and at Heriot Watt College, Edinburgh, receiving the diploma of the latter, and being also Class Medallist in the majority of his subjects. He was also top man and Silver Medallist in Honours Electrical Engineering, City and Guilds, in 1899. Mr. Dalziel served his apprenticeship with Bertrams Limited, Edinburgh, and gained further experience with Mavor & Coulson, Glasgow, prior to joining the former Midland Railway as an Electrical Inspector in 1899. In 1903, when the heavy electrical work was transferred to the Locomotive Department, he was placed in charge of electrical constructional work including the drawing office, workshop and outside gangs, and in 1905 also of the general and hydraulic outdoor machinery, drawing and estimating. In 1914 he was appointed Chief Electrical Assistant to the Chief Mechanical Engineer, having charge of both new work, operation and maintenance, and two years later was given the supervision of all the company's road motors, both petrol and electric. During the war in Sir Henry Fowler's absence on Government service, he took charge of the department jointly with Mr. J. E. Anderson, being responsible for the outdoor machinery, electrical, gas and fire sections. Subsequent to the amalgamations and separation of the Electrical from the C.M.E.'s Department, as an independent department, Mr. Dalziel became Assistant Electrical Engineer, L.M.S.R., in 1925, from which position, in anticipation of certain changes which did not finally eventuate, he was transferred to the staff of the C.M.E. on Col. Leigh's retirement in 1934. Mr. Dalziel accompanied Sir Guy Granet and the late Mr. F. Tatlow to the U.S.A. in 1913-14, and has also paid similar visits to Continental countries. In 1910 he was awarded a Telford Premium for his joint authorship with Mr. J. Sayers, of a paper read before the Institution of Civil Engineers, the subject being the Heysham electrification of the Midland Railway. He is a member of the Institution of Electrical Engineers and a Fellow of the Royal Society of Arts. He has been Chairman of the L.M.S.R. Federation of Rifle Clubs since its inception and of the R.A.A. Rifle Shooting Section; he has also captained the British Railways team in the international competitions with Canadian and American railways for about ten years. Mr. Dalziel was, moreover, some time Secretary of the Derbyshire County Rifle Clubs Association and the N.R.A. Astor Cup Secretary, and is well known as a rifle shot.

An article regarding Mr. Dalziel's work begins on page 104.

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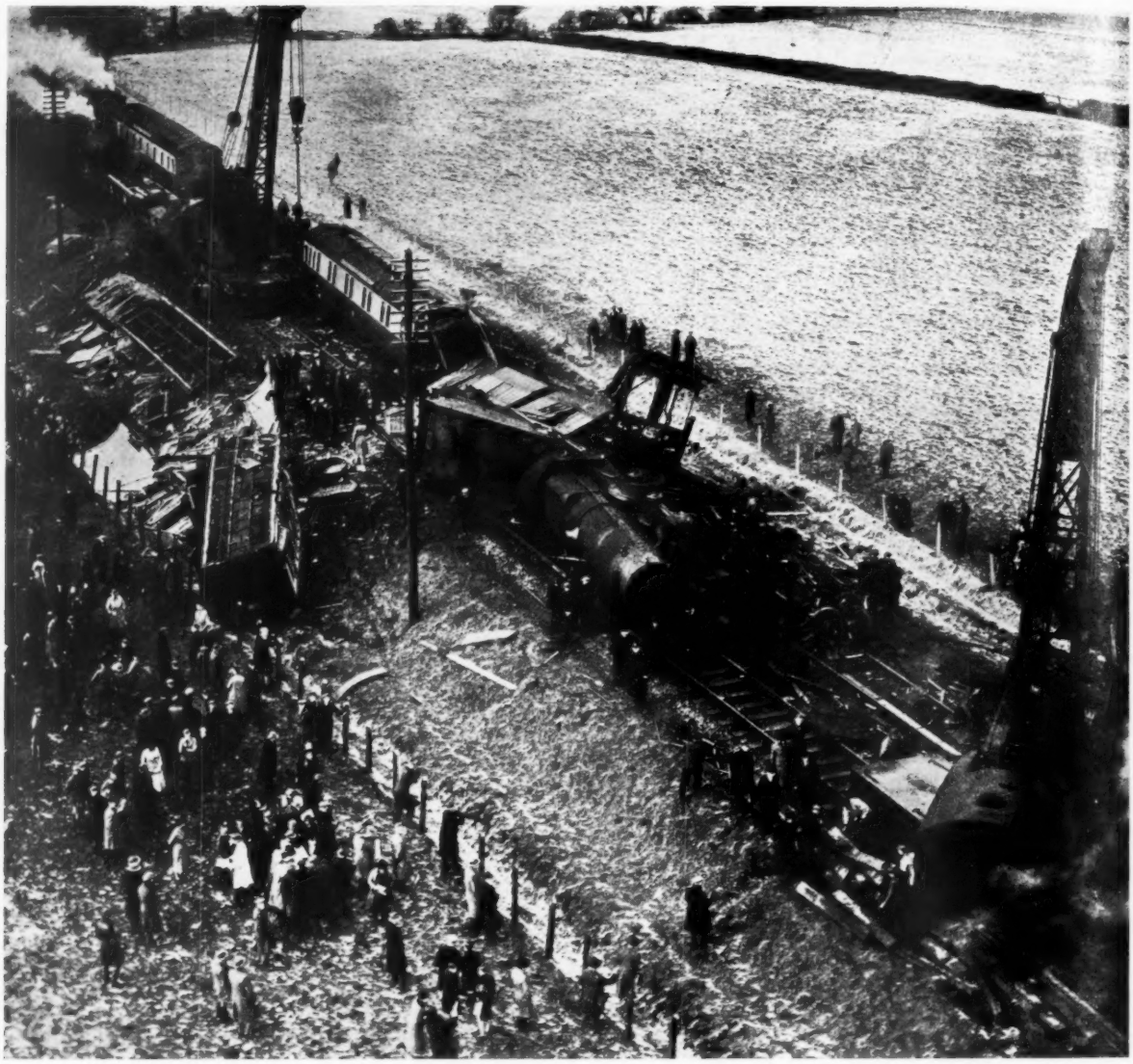
Captain Latta, who, as announced in The Railway Gazette of December 27, has succeeded Captain Gillies as General Manager, Canadian Pacific Steamships Limited, began his career

*Mr. G. Sutherland,*
Appointed Chief Accountant, L.N.E.R.

*Mr. J. Dalziel,*
Assistant Electrical Engineer, L.M.S.R., 1925-35

*Captain Latta,*
Appointed General Manager, Canadian Pacific Steamships Limited



*Aerial view of the accident to the 9 p.m. night express from Penzance to Paddington near Shrivenham on January 15. Note comparative immunity of steel-panelled coaches*

*Left, girder span of the old Masnedsund railway bridge (3 on sketch map) pushed off the pier by the tanker and damaged; and (right), contractor's bridge and new road-and-rail Masnedsund bridge seen from old bridge—note proximity of all three bridges* (*See overseas notes on page 103*)

with the Canadian Pacific over thirty years ago, and during this period he has commanded liners of the company's fleet in the most important field of the North Atlantic passenger service, and for several of the Canadian Pacific world and other cruises. He assumed the position of Commodore in 1931, and only retired from actual sea service when he relinquished command of the flagship *Empress of Britain* in 1934. He was the first commander of the *Empress of Britain* on her maiden voyage in May, 1931. Captain Latta made his first voyage as an apprentice on the ship *Ardoncraig*. In 1904 he joined the Canadian service as Fourth Officer of the *Atlantic*. Six years later he became Chief Officer, and took command of his first ship in 1917. The first *Empress of Britain*, which was later renamed *Montroyal*, was one of his early commands, and his subsequent commands included the *Empress of Scotland*, *Empress of Australia*, and the *Empress of Japan*.

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Mr. Astley Barton, Assistant Secretary of the South Durham Steel and Iron Co. Ltd., has been elected by the London & North Eastern Railway directors as a Commissioner on the Hartlepool Port and Harbour Commission, *vice* Mr. Charles Macfarlane, deceased.

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Mr. H. M. Cameron who, as recorded in THE RAILWAY GAZETTE of January 3, has been appointed Assistant to the London District Goods Manager, Paddington, G.W.R., joined the railway at Cheltenham Goods station in 1895. He was transferred to Gloucester District Goods Manager's office in the following year, and to Swindon Goods in 1897. Returning to Gloucester in 1901, he gained experience in various sections of the District Goods Manager's office and Goods Department. In 1911 he was transferred to the Irish Traffic Manager's office at Dublin and from there to the Manchester District Goods Manager's office as Chief Rates and Conference Clerk, in 1913. Upon the re-opening of the District Traffic Manager's office at Manchester, in 1922, he was appointed Chief Clerk, and was transferred to a similar position in the London District Goods Manager's office in 1931, in which he is now promoted Assistant Manager.

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Mr. John Russell, who, as announced in our issue of January 3, was recently appointed Assistant District Goods Manager, Birmingham, G.W.R., entered the service of that railway in August, 1896, at Waterford, where he gained experience in the passenger, parcels, goods, and livestock departments. On the opening of the Irish Traffic Manager's office in Dublin in 1904, he was transferred to the Irish capital. In 1916 he was appointed to the Manchester District Goods Manager's office, and in October, 1917, returned to Dublin as Chief Clerk to the Irish Traffic Manager. Mr. Russell was promoted to Shrewsbury in 1925 as Goods Agent, and later in the same year was appointed Goods Agent at Lawrence Hill, Bristol. In 1927 he became Chief Clerk to the Bristol District Goods Manager, which position he now vacates.

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Mr. A. Langmead, Chief Controller, Newport, G.W.R., has just retired under the age limit. Together with Mr. Hadley—now Editor of the *Great Western Railway Magazine*—Mr. Langmead was selected for the control of the very heavy South Wales traffic in 1909, and when Mr. Hadley took over his present duties at Paddington in 1912, Mr. Langmead became Chief Controller.

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We regret to record the recent death of Mr. Robert Paterson, Traffic Manager, Wilts United Dairies, who was well known to many railway officers. The cremation took place at Bristol and among those present at the funeral were: Messrs. R. G. Pole, G. R. Fox, A. H. King, R. G. Barefoot (also representing Messrs. A. Maynard, H. W. Payne and F. W. Lampitt), all of the G.W.R., and Messrs. Webster and Mitchelson (representing Mr. G. S. Rider) of the L.M.S.R.

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Mr. W. E. Butland, who, as announced in our issue of January 3, has been awarded the O.B.E., in the New Year Honours List, is Divisional Bridge Inspector at Plymouth, G.W.R., and also has charge of the tunnels in that area. Except for four years' service on the New South Wales Government Railways, he has been employed on the G.W.R. since 1889. He was elected a Vice-President for England of the Permanent Way Institution (Incorporated) in 1928, and has been a member of its Executive Council for 14 years, has been Chairman of the West of England section of the institution, and is now Secretary of it. Mr. Butland also won the competition for the best essay for the training of permanent way men, open to all members of the institution. Much of his work entails the rebuilding and maintenance of bridges which his grandfather helped to construct under Brunel.

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INDIAN RAILWAY STAFF CHANGES

Mr. W. E. G. Bender, who, as announced in our issue of January 3, has just been awarded the C.I.E., returned from leave on November 26 and resumed duty as Chief Engineer, B. & N.W. and R. & K. Railways.

Lt.-Col. R. H. Stallard, O.B.E., R.E.(Ret.), Senior Deputy Agent, M. & S.M.R., returned from leave and resumed his duties on December 23.

Mr. W. H. H. Young has been appointed to officiate as Chief Commercial Manager, E.I.R., as from November 30.

Mr. H. Carter Norbury has been appointed to officiate as Controller of Railway Accounts as from December 16.

Mr. G. A. R. Trimming, Chief Mechanical Engineer, E.I.R., has been granted nine months' leave as from January 20.

Mr. H. H. Saunders, Deputy Chief Mechanical Engineer, E.I.R., has been granted 15¾ months' leave preparatory to retirement, as from September 13 last.

Mr. B. L. Harvey, Officiating Deputy Chief Engineer, E.B.R., has been granted 10 months' leave as from January 1.

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Mr. Shirley H. James, Manager, Pickfords Travel Service, who organised the recent world tour of 277 Members of the British Medical Association, has been presented with a handsome gold cigarette case. The inscription reads: "With grateful thanks for all your help and the preparatory work which ensured the great success of the British Medical Association Round-the-World Tour 1935."

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The Rt. Hon. Lord Hirst of Witton, has accepted nomination as President of the Federation of British Industries for the coming presidential year, which begins in April. Lord Hirst has through his chairmanship of the Empire Committee in recent years rendered signal service to the F.B.I. The Rt. Hon. Lord Aberconway, C.B.E., of Thomas Firth & John Brown Limited, and Mr. A. H. Kilner of Courtaulds Limited, have been nominated as additional Vice-Presidents of the federation.

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The Council of the Royal Institute of British Architects has nominated Mr. Charles Holden for the award of the Royal Gold Medal in 1936. Its award is not limited to British architects, and may be made to any outstanding architect. Mr. Holden is best known as the designer of the Underground Building, 55, Broadway, and of numerous modern stations on the L.P.T.B. railways that have so frequently been illustrated in our pages. He was also the designer of the new London University buildings.

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Monsieur R. G. E. Vallantin, Chief Mechanical Engineer of the Paris, Lyons & Mediterranean Railway, retired on January 1. A student first at the École Polytechnique and then the École d'application du Génie maritime, M. Vallantin became a marine engineer for some years, but joined the C. de fer de P.L.M. in 1907 as a technical assistant in the head offices, dealing after a time solely with locomotive matters. In 1916 he was appointed to deal with rolling stock of all kinds, and two years later he became Running Superintendent, at a time when the traffic problem was particularly acute; shortly afterwards he was made Assistant Mechanical Engineer. He was appointed Chief Mechanical Engineer in May, 1919. In this capacity he had to make good the deficiencies left by the war years and carried out an extensive programme of reconstruction of rolling stock and locomotive shops and depots. He was responsible for several interesting loco-

motive designs. On February 26, 1931, he read a valuable paper entitled "Compound Locomotives of the P.L.M. Railway" before the Institution of Locomotive Engineers in London, of which he is a member. M. Vallantin has retired with the title of Honorary Chief Mechanical Engineer.

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The Rt. Hon. the Earl of Bessborough, G.C.M.G., has been elected a Director of the Rio Tinto Co. Ltd. in place of Mr. J. Gordon Macleod, resigned.

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Mr. F. J. Pascoe, Director and Financial Adviser of British Timken Limited, Birmingham, was married to Miss Margaret Esson Scott, at the Chapel of the Savoy on January 7. The bride, a daughter of the late Colonel F. J. Scott, was given away by Sir George Fowler. The guests at the wedding included:—

Mr. Frank Dudley Docker; Mr. Michael Dewar (Chairman, British Timken), and Mrs. Dewar; Mr. Geoffrey Burton (Managing Director, B.S.A.); Mr. H. Moyses (Managing Director, Birmingham Railway Carriage and Wagon); Mr. Noel Docker (Director, International Combustion); Major Greg; Sir Philip and Lady Nash; Sir Robert and Lady Renwick; Admiral Sir Charles Carpendale and Lady Carpendale; and Major C. F. Entwistle.

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INSTITUTE OF TRANSPORT

The following corporate members and associate members were elected during December:—

*Members*

Mr. T. E. Chrimes, Assistant Divisional Superintendent, Locomotive Running Department, Southern Railway.

Mr. S. H. Fisher, Assistant Chief Operating Manager, L.M.S.R.

Mr. C. H. Sutherland, Assistant to Chief Accountant, L.M.S.R.

*Associate Members*

Mr. R. S. Cunningham, Gold Coast Government Railway.

Mr. R. L. Mabey, Port of Bristol Authority.

Mr. J. Maltman, L.N.E.R.

Mr. W. F. Peakall, Southern Railway.

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Mr. Henry Wight, who retired from the post of Chief Cashier, North Eastern Area, L.N.E.R., on December 31, after 47 years' service, has been presented with a silver salver by his brother officers. Owing to Mr. Wight's ill-health, it was unfortunately necessary to dispense with a formal gathering and banquet of officers at which to make the presentation. The ceremony was, however, performed by Mr. Thomas Hornsby, the Divisional General Manager, North Eastern Area, who entertained Mr. and Mrs. Wight to lunch at the Royal Station Hotel, Newcastle, on January 7. Mr. Hornsby conveyed to Mr. Wight the appreciation of the directors of his long and honourable service with the company, and expressed the hope that Mr. Wight would soon be restored to health and enjoy a well-earned retirement.

# Modern Methods of Permanent Way Maintenance

(*See editorial note on page* 95 *and Scrap Heap paragraph on page* 100)

This was the subject of an informative paper read by Mr. J. C. L. Train, Assistant Engineer (Maintenance) for the Southern Area of the L.N.E.R., to the Institute of Transport in London, last Monday. The President (Sir Cyril Hurcombe) presided.

To illustrate the magnitude of permanent way work, Mr. Train quoted an annual consumption of 180,000 tons of rails and 3½ million sleepers, included in a total of £3,000,000 as the annual cost of permanent way renewal of the four group railways. Dealing with speed and punctuality, he mentioned theoretical and actual speeds permitted for various superelevations on curves, and gave a typical instance from American practice where a safe speed was laid down as 109 m.p.h. with a given locomotive on a curve of 86·7 chains radius, whereas the overturning speed was 178 m.p.h. Furthermore, he said, the safe speed would probably be in excess of the comfortable speed.

One cause of permanent or semi-permanent speed restrictions was, Mr. Train pointed out, due to colliery subsidence. The extraction of coal brought an enormous revenue to the railway companies, but on the other hand, it was responsible for considerable interruption of traffic. Since the passing of the Mines (Working Facilities and Support) Act, 1923, a colliery company desiring to work coal under or adjacent to a railway must give the railway company at least 30 days notice. Generally a mining engineer then advised the civil engineer of the probable depth and extent of subsidence and whether it would occur rapidly or gradually. If the engineer considered that cost of making good damage so caused was likely to exceed cost of compensation to the colliery company and royalty owners for leaving coal unworked, a counter notice was serviced on the colliery company requiring that company to leave unworked all or any part of the coal likely to cause subsidence by its extraction.

In connection with rail joints, Mr. Train referred to the satisfactory results obtained with the short two-bolt fishplates in this country, and suggested caution in the reduction of joints by welding—a practice which was receiving much attention at the present time. A properly packed track was more closely associated with comfort than any other factor and, incidentally, had considerable effect on the life of both permanent way and rolling stock. Mr. Train described the different systems in vogue, which might be divided briefly into three groups: beater packing, shovel packing, and machine packing. The first was laborious, but if properly executed, gave first class results. Similarly shovel packing produced at least equally good results and was cheaper in the first instance, costing £11 a mile as against £20 for beater packing. Machine packing could be carried out electrically, pneumatically or purely mechanically, and in first cost came out lower than hand beater packing but higher than shovel packing.

Good drainage and the necessity of cleaning ballast was touched upon before the author dealt with the subject of rails, which in this country today varied between 85 lb. and 100 lb. per yd. according to the class of traffic. The amount of wear allowed was in a typical instance from 100 lb. to 83 lb., from 95 lb. to 80 lb., from 85 lb. to 76 lb. per yd. There had been a tendency recently to replace the higher carbon rail, containing carbon from 0·5 to 0·6 per cent., by medium manganese rails which were specified to have a manganese content up to 1·2 per cent. instead of as previously a maximum of 0·9 per cent.

Comparing roads with railways, Mr. Train gave some striking figures of the relative costs of renewal and maintenance. The maintenance, repair and minor improvement of Class 1 roads, he said, was given as £445 a mile, or £347 a mile in the case of Class 2 roads. If this figure could be regarded as maintenance, it was considerably more than the cost of repairs and partial renewals of the main group railways which amounted to about £130 a mile of single track per annum. Taking renewal of way they knew that in this country the cost of complete renewal of track with modern materials, including switch and crossing work, came out at somewhere about £2,200 a mile for wages, materials, engine power, &c. He gathered from district reports embodied in the Ministry of Transport report that the cost of re-surfacing classified roads worked out at about £5,000 per mile.

Mr. A. R. Cooper pointed out that the introduction of new appliances and methods in permanent way engineering increased the necessity for suitable instruction and advice. Railways had accomplished a great deal during the last few years by increasing the number of technical institutions and committees. Much had been done to improve the knowledge of permanent way men, and experiments had been made regarding the possibility of an examination for candidates.

Others who contributed to the discussion were Col. A. H. L. Mount, Messrs. A. S. Quartermaine, C. E. R. Sherrington, J. S. Nicholl and J. W. Melville.

# The Structure of the German Transport System*

The reconstruction of transport as an organic whole was carried out earlier than with other branches of industry in Germany. As early as 1933 the Reich Minister for Transport created the Reich Transport Council as the peak of the unified traffic organisations. The ordinance of February 27, 1934, designed to prepare the way for the organisation of the economic system, specified that of the twelve branches of industry provided for as national groups in the industrial structure, the transport group should come under the Minister of Transport instead of the Reich Minister of Economics.

The reason for this special position of transport in the economic structure lies in its predominantly public character. The transport industry is unlike the sphere of production in that its development has a strong bias towards monopoly. Transport is not an end in itself; it is merely a serving unit of the industrial system. Its performance is a national service. By far the greater part of the German transport industry is carried on on a basis of public law. Nevertheless, a complete nationalisation of transport is not contemplated in Germany; but at the same time transport is subjected more closely than any other branch of German industry to State guidance and planning. Thus, the ordinance of December 4, 1934, bearing on the conveyance of people to the country, had the following preamble: "In the National-Socialist State the direction of transport is one of the tasks of the State. The means of transport may be in public or in private hands, but all must follow rules of procedure enacted uniformly for the whole country."

The Reich Ministry of Transport was from the outset in close association with the trade organisations of the transport industry. The First Enactment for the Introduction of the Law for preparing economic organisation, November 27, 1934, stated expressly in paragraph 44 that the conditions for entrepreneurs, enterprises, and trade associations, and their composition and construction, should all be decreed by the Reich Minister for Transport, and not the Leader of Industry, or the Reich Minister for Industry. The law of February 27, 1934, for the simplification and economy of administration, enacts that the Reich Minister of Transport is responsible for the unity of the transport policy controlling the means of transport at the disposal of the Reich Ministry of Transport, the Reich Ministry of Posts, and the German State Railway. We are at present in the midst of an extremely far-reaching transition in the transport system. In Germany a violent expansion of all means of transport is to be established. The greatest development is in the motorcar, where Germany has much ground to make up. There is an urgent need to strike a synthesis between the technical developments and the maintenance of real capital. Under these circumstances, the only course was to bring all means of transport uniformly under one management, and to make the industrial province of transport organically independent.

Immediately after the formation of the Reich Transport Council, the Minister for Transport commissioned leading men in the various branches of transport to prepare an organic reconstruction of the industry. At the sixth session of the Reich Transport Council, which took place on June 12, 1935, under the presidency of the Reich and Prussian Minister for Transport at Rüdesheim (Rhineland), a draft of an ordinance concerning the organic reconstruction of the transport industry was discussed. After extremely lengthy discussions, the ordinance dealing with this subject was issued on September 25, 1935 (Second Ordinance for the Introduction of the Law for Preparing Economic Organisation). This ordinance, which came into force on October 1, 1935, was the outcome of extremely lengthy consideration of the organic professional structure of transport. By it, the professional organisation of the structure of the whole transport industry received its final form.

The whole German transport industry is incorporated in the seven national transport groups of Overseas Shipping, Inland Shipping, Motor Transport, Horse Traffic, Railway and Tramway Traffic, Forwarding and Storage, and Auxiliary Transport Concerns. The decisive importance of these groups as the peaks of the transport system arises from the fact that they alone are legally competent, and, further, that their leaders are appointed by the Reich Minister for Transport himself. The functional and regional associations of the Reich Transport groups are not legally competent.

Groups of the transport branches may form working associations. For long-distance transport, both mechanical and horse, these must be formed. On the basis of this condition an agreement was concluded between the Overseas and Inward Shipping and Forwarding and Storage groups, at the beginning of October, by which a Working Association of the Harbour Traffic Enterprises of Hamburg Harbour has been founded. The aim of this working association is the promotion of an effective and reliable harbour commerce through the responsible co-operation of all associations and members of the working association, founded upon mutual confidence. This is administered by the Harbour Council.

The Reich transport groups are organised in functional groups, which are in turn organised where necessary into subordinate functional groups. The Reich Transport Council and regional transport councils are formed by representatives of (*a*) the transport industry, with the addition of representatives of the publicly administered transport concerns and the General Inspector of the German roadways, *i.e.*, the providers of transport, and (*b*) representatives of productive industry, of the Reich Food Estate, of the Reich Chamber of Culture, and of the municipalities, *i.e.*, the users of transport. The task of the Reich Transport Council, and of the regional transport councils, is to advise upon matters of transport. The institution of the regional councils filled a gap, since the transport industry was thereby linked up regionally with the other branches of industry. This regional substructure of the transport industry had previously been lacking. It is an important point that the German Labour Front is also represented in the national and local councils, in its capacity of a representative of the users of transport.

The transport industry, in the form of this organisation, is a member of the Reich Chamber of Commerce and of the other chambers of commerce. At the suggestion of the Reich Minister for Transport, the Minister for Industry appoints three representatives of the transport industry and one representative of the German Railway Company to the advisory council of the Reich Chamber of Commerce. The Leader of the Chamber of Commerce appoints not more than three representatives of the transport organisations nominated by the Minister for Transport, to the advisory council of the Chamber of Commerce. In this way the co-operation of the whole public and professional system of transport with the structure of the industrial system is assured. The alliances created guarantee co-operation between the branches of the transport industry and of the industrial system.

The Minister for Transport defines the functional groups and the limits of their operations by means of general legislation. By this legislation, the entrepreneurs and enterprises which are independently engaged, or become engaged, in the functional sphere become members of the competent Reich transport group. Establishments in Germany of foreign concerns are counted as belonging to the German transport industry. While the State meets the expenses of the national and local councils, those of the national transport groups, the functional groups (*i.e.* according to function) and the subordinate groups are met by the levy of contributions. Each group of the transport industry is allotted a leader, whose activities are honorary. The leaders of the national transport groups are appointed by the leader of the Reich transport group, with the consent of the Minis-

* Based on an article signed "Dr. S.-K." in the "Bulletin of the Hamburg World Economic Archives."

ter for Transport; and the leaders of the regional associations of the functional groups are appointed and displaced by the leader of the functional group with the consent of the leader of the Reich transport group. The leader of the Reich transport group publishes the ordinances of the group with the consent of the Minister for Transport. Every Reich Transport group has a manager-in-chief, appointed and displaced by the leader of the Reich group, with the consent of the Minister.

Besides representing their own general interests, the Reich transport group and its associations have to advise and look after their members in the functional sphere. Each leader has to manage his group in such a way as to serve the interests of the State. For this, all leaders and members of all associations are bound by the instructions of the leader of the Reich transport group. The groups may carry on business which extends beyond the sphere of their competency only by agreement with, or through, the Reich transport group. Every leader is responsible to the group and to the leaders of superior groups for the orderly conduct of his group. The leader of the functional group may compel members who deliberately act against his instructions, in spite of a repeated written demand, to conform, under a penalty of 1,000 RM. Each group of the transport industry receives an advisory council, which is composed of the leaders of the functional groups. The leader of the Reich transport, with the consent of the Minister for Transport, may co-opt persons other than members to the council. The advisory councils of groups of the functional or regional associations are composed of the leaders of the nearest groups of these associations. The leader of the council is the leader of the group. The leader is required to consult the council before taking important measures.

Every subordinate group of the associations of a Reich transport group must hold an annual general meeting of its members. If the effective sphere of the subordinate group extends into a larger province, the leader of the Reich transport group may decide that the advisory council shall be summoned in place of the general meeting. The general meeting is for the purpose of stating and explaining the activities and financial position of the group to the members.

Entrepreneurs and enterprises in transport (*i.e.* transport industry) in the meaning of the Act are those under private control, and all transport concerns controlled by the administrative districts, municipalities and associations of municipalities. They do not include those State transport enterprises administered under public law.

The content and aim of the new ordinance, which creates a new conception of transport as a whole, is the development of the transport system, with all its providers, into a living community which shall condition itself by mutual interaction. The ordinance is an instrument ready for the instant use of the Führer and Chancellor in his political and politico-economic action. It puts means into the hands of the leadership of the State to utilise all functions of the transport system in the common interest. At the same time, through the organic concentration of all forces, the most satisfactory organisation for the supervision and advice of the individual providers of transport has been created. A transport system which lacked this vital industrial organisation would not be capable of doing justice to its task. Only thus has smooth co-operation between the transport organisation and the means of transport become possible.

The leader of the Reich Transport Forwarding and Warehousing Group, Dr. Ludwig Doeberl, explained at the conference of industrial warehousekeepers of Germany at Magdeburg at the end of September, 1935, that all dealings, planning and aims of individuals as of the whole were directed by the principle that all transport effected represented a service to the national community. "Side by side with far-sighted public planning, we shall always need, even in the future, the daring initiative of the entrepreneur who is ready to make hazards, as a strong, helpful and vital element in the German transport system." As in warehousing, so in all other branches of transport, there is a multiplicity of private, public and semi-public, big, medium-sized and small concerns to be found. In the Reich transport groups the industrial elements are mingled with tasks of the administration. It is the task of the Reich transport groups and their associations to ensure a regulated competition without at the same time killing the vital elements of personal initiative and personal impulse. The legislation dealing with the organic reconstruction of the transport system makes it possible to eliminate the uneconomic elements, which, lacking control and without authoritative precepts, would impair the peaceful, constructive and permanent building up of the German transport industry. Through this protection afforded to professional transport undertakings, the transport industry, the importance of which is attested by the fact that the total expenditure of the whole nation on transport amounts to 8·5 milliard marks, or 17 per cent. of the national income, will be able to fulfil its great tasks to the benefit of the national economic system as a whole.

## Southern Divisional Engineer's Staff Dinner, Southern Railway

The third annual dinner of the Southern Divisional Engineer's staff was held at Brighton on January 10, when Mr. C. V. Hill, Divisional Engineer, presided over a record attendance. Among those present were Messrs. F. E. Campion, C. J. C. Latham, D. Sheppy, G. H. Hare Dean, J. H. Knotts, L. Furnival, G. Healey, L. A. Sears, R. Gurd and H. V. Russ. Mr. G. S. Findlay, Assistant Divisional Engineer, proposed the health of "The Chairman," and remarked that the large attendance celebrating the third annual dinner of the staff was proof of the high regard in which Mr. Hill was held, not only by his colleagues, but by all the members of the various departments with which they came into contact. Mr. C. V. Hill, replying, spoke of the exceptionally busy year just past for which the work of preparing the extension of electrification to Eastbourne and Hastings had been responsible. They had been rushed for time and everything had had to be very carefully planned, yet on no occasion had the engineers delayed any train, and the work had been punctually concluded. Mr. R. Gurd proposed the toast of "The Guests," to which responses were made by Mr. C. J. C. Latham, London Central Divisional Superintendent, and Mr. F. E. Campion, Division Engineer, London East.

## Rebuilding Euston Station, L.M.S.R.

The most important of the schemes to be carried out by the L.M.S.R. under the loan guarantee of the Government provided by the Railways (Agreement) Act, 1935, is the rebuilding of Euston station including the hotel and offices. Many of the existing buildings were erected nearly a century ago to the designs of Hardwicke, and the reconstruction of the station will involve a complete demolition of all buildings between the station and Euston Road, and rebuilding within those limits.

In view of the importance of the work the Directors have appointed Mr. Percy Thomas, the new President of the Royal Institute of British Architects, as Consulting Architect, to co-operate with the company's Architect, Mr. W. H. Hamlyn, F.R.I.B.A., and the Chief Civil Engineer, Mr. W. K. Wallace, in the preparation of plans and designs for the whole of the buildings embraced in the scheme, including the railway station, hotel, and offices for the company's staff. Mr. Percy Thomas has been the architect for a number of public works, the most important of which is the new Civic Centre at Swansea, which was completed last year; others being the Law Courts and public buildings for the County Borough of Accrington, Cardiff Technical College, and the offices of the Glamorgan County Council.

## B.M.A. Round-the-World Tour

The British Medical Association members have now returned to England after what has proved to be a most successful round-the-world tour. The itinerary was as follows, alternative routings between towns shown in capital letters being in parentheses; ENGLAND - New York - Washington-Chicago - Grand Canyon - Los Angeles (Montreal - Toronto - the Great Lakes-Calgary-Banff-Lake Louise-Vancouver-SAN FRANCISCO - Honolulu - Suva-Auckland - Rotorua - Sydney - Melbourne-Sydney - BRISBANE - Macassar - Bali (Townsville-Thursday Island-Port Darwin) - SOURABAYA-Samarang-Batavia-overland via Java-Singapore-Kuala Lumpur - Penang - Colombo - Bombay - Aden-Cairo-Port Said-Malta-Marseilles-Gibraltar-Plymouth-London.

Special train movements were made over the sections indicated of the following railways: Baltimore & Ohio Railroad (New York-Chicago); Atchison Topeka & Santa Fe Railway (Chicago-Los Angeles); Canadian Pacific Railway (Montreal-Vancouver via Lakes); New Zealand Government Railways (Auckland-Rotorua); and Federated Malay States Railways (Singapore-Kuala Lumpur-Penang).

These details give some idea of the extent of the arrangements necessitated by the handling of a party of 277 passengers. The party was handled throughout the entire journey by only two representatives of Pickfords Travel Service, which was responsible for all the arrangements, with the addition of local representatives, Mr. Harley Dickinson in New York, Washington, and Chicago; the C.P.R. representative across Canada; Sir Morris Hedstrom & Company in Suva; and Dalgety & Company in New Zealand and Australia. The plans were in hand two years before the party sailed.

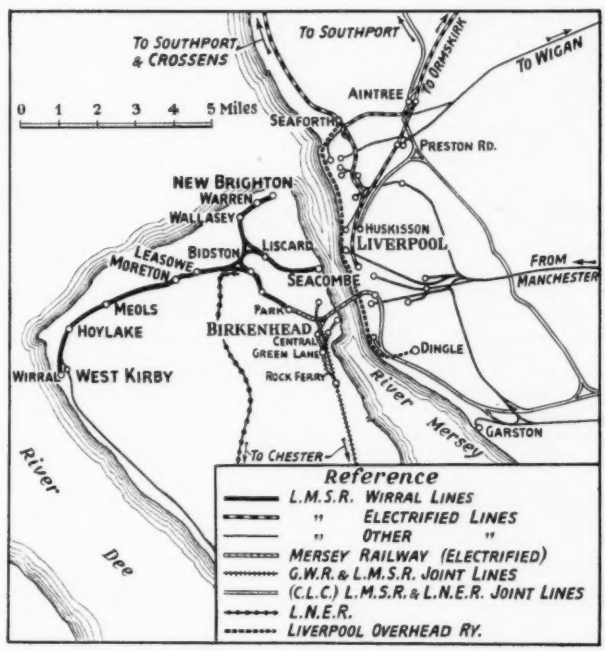
Sight-seeing by private motor was included at every port of call, and various special entertainments were provided en route; for example, the party witnessed the fire-walking display in Suva, it was received by the ruling Prince and witnessed an important cremation ceremony in Bali, and special native dances were arranged in Java.

A feature of the tour of which Pickfords Limited may well be proud is that Pickfords Travel Service has received not a single complaint, but scores of unsolicited letters of praise have come to hand from some of the leading physicians and surgeons. The trip was the largest round-the-world tour undertaken, apart from round-the-world cruises organised by steamship companies. It occupied 105 days and covered over 30,000 miles, and the average cost per capita for first class travel throughout was under £250. The handsome printed itinerary (to which we made reference on page 178 of our issue of August 2 last) occupied 180 pages and contained many maps and town plans; a copy was presented to every member.

Mr. Shirley H. James, the Manager of Pickfords Travel Service, who organised the tour, has been presented with a handsome inscribed gold cigarette case bearing the following wording: "With grateful thanks for all your help and the preparatory work which ensured the great success of the British Medical Association Round-the-World Tour 1935."

## Electrification of the Wirral Section, L.M.S.R.

As part of the works covered by the Railways (Agreement) Act, 1935, the L.M.S. and Mersey Railway Companies announce that arrangements have been made to put in hand forthwith the necessary work for establishing a service of through electric trains between the Wirral Peninsula and Liverpool (Central station). The L.M.S.R. lines from West Kirby and New Brighton to Birkenhead Park—where they join the Mersey Railway—are at present steam operated, and these will be electrified on the third rail system at 650 volts. Some alterations will be required on the Mersey Railway to permit of the running of through electric trains between the Wirral section of the L.M.S.R. and Liverpool Central station, Mersey Railway. It is proposed to speed up the arrangements for dealing with passengers at the James Street station of the Mersey Railway by replacing two of the present hydraulic lifts by four new high speed electric lifts. There will be a 10-minute service to and from Liverpool for both the West Kirby and New Brighton sections at the morning and evening business periods and for a short period at mid-day; during other parts of the day a 15-minute service will be run for each section and this will be increased as necessary at holiday times. The improved service at mid-day will enable Liverpool business men to get home to lunch.




*L.M.S.R. lines in the Wirral Peninsula. The whole of the former Wirral Railway (shown by a thick black line) is to be converted to electric traction, except the branch to Seacombe, and through services from Liverpool Central station to West Kirby and New Brighton provided via the Mersey Railway*

Arrangements have been made by the two railway companies to use existing Mersey Railway stock for certain of the through services. The other trains will be worked by new vestibule stock to be provided by the L.M.S.R.; this will consist of three-car articulated units, with accommodation for both first and third class passengers, and during the morning and evening busy periods and also at holiday times, six-car trains will be run. The scheme also provides for many improvements in the Mersey Company's existing stock including the provision of heating and upholstered seats throughout.

At the present time through passengers for Liverpool from the West Kirby and New Brighton sections have to change trains at Birkenhead Park station; this inconvenience will be avoided under the new arrangements, and the through electric services will enable the journey from West Kirby and New Brighton to Liverpool to be made more quickly. The average time saved on the throughout journeys will be several minutes; the time occupied from West Kirby to Liverpool Central will be 29 min. and from New Brighton 20 min. Other stations will also benefit by a shorter journey time.

# NOTES AND NEWS

**Western National Omnibus Co. Ltd.**—This company, in which the G.W.R. is a large shareholder, has increased its capital to £2,183,576 by the addition of £100,000 in £1 ordinary shares.

**L.N.E.R. Week-End Cruises During 1936.**—The L.N.E.R. has arranged twelve week-end cruises from Harwich during 1936. Places to be visited include Antwerp, Amsterdam, Flushing, The Hague, Zeebrugge, and Ghent. The fare from London, including all meals on board, will be 72s. 6d.

**Ribble Motor Services Limited.**—A bonus of one ordinary share for every three held is proposed by the directors. Part of the company's reserves will be capitalised for this purpose. A meeting to sanction the proposal will be held on February 19. The bonus shares will rank for dividend as from January 1, 1936. The company is controlled jointly by the L.M.S.R. and Tilling & British Automobile Traction Limited.

**One Hour Service to Paris.**—By the use of the Marcel Bloch 200, a twin-engined super-charged aeroplane adapted for commercial use from a fast troop-carrying machine of which 130 were ordered last year for the French Air Force, an air service linking London and Paris within an hour will be established during the first half of the year. The aeroplane is understood to be nearing completion in France, and will be put on the regular passenger service operated by Air France between Croydon and Le Bourget.

**Discontinuance of Slip Coaches, L.N.E.R.**—With reference to the article in THE RAILWAY GAZETTE of last week entitled "Slip Coach Services," the slip carriages for Finmere, and Woodford & Hinton on the 6.20 p.m. Marylebone to Bradford express will be discontinued on February 1, and the train will stop at Finmere at 7.27 and Woodford & Hinton at 7.44. The Woodford slip was a through carriage to Stratford-on-Avon, and this, with the corresponding return service at 7.45 a.m., will also be discontinued (see editorial note on page 94). Five minutes have been added to the timing of the train to allow for the additional stops.

**Railways and the Storm.**—Several railway mishaps resulted from the storm which affected most parts of the country early this month. On January 8 a G.W.R. train from Launceston to Plymouth collided with a tree which had fallen across the line near Coryton. The chimney of the engine was knocked off, and all windows on one side broken, but there were no serious injuries. A similar accident occurred to an L.N.E.R. goods train at Kendal Green, near Barnsley, on January 10. On the same day, the G.W.R. permanent way between Harlech and Penrhyndeudraeth was washed away on stretches totalling two miles, and all traffic had to be suspended.

**Bilbao River & Cantabrian Railway.**—The registered office is now at the offices of J. H. Hugill & Co., Secretaries, 101, Leadenhall Street, London, E.C.3. This Spanish railway works 23 km. of line with 11 locomotives, 3 carriages, and 464 wagons.

**The Scarborough Flyer.**—With reference to the article entitled "British Railways in 1935," on page 44 of our issue of January 10, it should have been stated that the timing of the up Scarborough Flyer from Monday to Friday in summer is 3 hr. 55 min., and 4 hr. 5 min. on Saturdays.

**Brazilian Railway Electrification.**—A Reuters message states that President Vargas gave an audience on Wednesday, at Petropolis, to Sir Felix Pole and Mr. P. S. Turner, Directors of Metropolitan-Vickers Electrical Co. Ltd. They were accompanied by Mr. W. A. M. Doll, of the Export Credits Department. Sir Felix Pole is Chairman of Metropolitan-Vickers Electrical Company, and Mr. Turner is its Sales Director and Manager of the Traction Department. They are visiting Brazil in connection with the electrification of the Government-owned Central Railway of Brazil.

**Accident to Great Western Express.**—Early on January 15, the 9 p.m. night express from Penzance to Paddington, travelling at speed, collided near Shrivenham with some goods wagons that had become detached from a preceding train. The locomotive, No. 6007 *King William III*, came to rest on its side, killing the driver, though the fireman escaped serious injury. Of the coaches nearest the engine, one was flung down the embankment, the body, torn from its steel underframe, landing upside down. It was saved from complete wreckage by the outside steel panelling. The illustration on page 120 brings out this point. Only one passenger's life was lost, and 26 passengers were injured.

**Northern Ireland Traffics.**—On railways wholly in Northern Ireland, the number of passengers (exclusive of season-ticket holders) carried during the first nine months of 1935 was 4,721,911, against 4,595,993 for the corresponding period of 1934, and receipts from passengers were £217,442, compared with £209,808. Merchandise and minerals carried in the first nine months of 1935 were 400,398 tons, against 398,010 tons in the corresponding period of 1934, and the total receipts from goods traffic were £133,161, against £133,082. On railways partly in Northern Ireland, passengers in the first nine months of 1935 numbered 4,719,574, against 4,194,832 for the corresponding period of 1934, and passenger receipts were £351,125, compared with £333,730. Goods and minerals carried in the first nine months of 1935 were 715,110 tons, compared with 698,635 tons in the first nine months of 1934, and total receipts from goods traffic amounted to £460,390, against £425,831.

**Mr. Frank Pick on the Organisation of Transport.**—Our attention has been drawn to a typographical error that crept into the report we published—on page 1027 of our issue of December 13 last—of Mr. Frank Pick's paper, "The Organisation of Transport." In the last line of the first column on that page, the percentage should read 34 and not 0·34.

**Streamlined Train for the New York Central.**—The New York Central Railroad has under construction a streamlined steam train which will be put into service in the spring between Cleveland and Detroit, via Toledo. The locomotive will be a streamlined Pacific, with roller bearings on the bogie, trailing, and tender wheels. The seven streamlined coaches (non-articulated) will be of lightweight steel construction, and will include a dining car with full restaurant service as well as a lounge bar car. All the vehicles are to be air-conditioned. The train will make the round trip of 164·2 miles each way daily at a schedule of approximately 60 m.p.h.

**Federation of Railway Lecture Societies.**—The second meeting of the L.N.E.R. Federation of Railway Lecture and Debating Societies (North Eastern Area) for the current session, was held at Darlington, on January 14. Sir William Gray, a director of the L.N.E.R. presided over a large audience drawn from all parts of the North Eastern Area. An address was given by Mr. H. N. Gresley, Chief Mechanical Engineer, L.N.E.R., on "Train Speeds." The lecturer gave an interesting account of the various experiments with high speed trains which had been carried out on the Continent, in the U.S.A., and in this country, and laid down certain requisites in such matters as locomotives, carriages, permanent way, and signalling, which he considered essential in the achievement of high speed operation.

**Great Southern Debenture Stock Issue.**—An extraordinary meeting of the proprietors of the Great Southern Railways Company, held in Dublin on January 10, authorised the creation of £637,892 debenture stock, redeemable or irredeemable, to be issued at such times and on such terms as the directors determine. This is in exercise of the borrowing powers conferred by the Great Southern Railways Amalgamation Scheme, 1925. Sir Walter R. Nugent, the Chairman, explained that a considerable sum had already been expended in the acquisition of competing road services, and this expenditure had been entirely justified by greatly increased earnings. So far, the necessary funds had been provided by temporary loans on satisfactory terms, but it was not prudent to continue to meet capital expenditure out of reserve. In the

directors' opinion the raising of this moderate amount of additional capital would not postpone or reduce the payment of dividends on the preference and ordinary stocks. They anticipated that the improved earnings would enable full dividends to be paid at an early date, and that the position of the company would at the same time be made more secure. The new issue would enable the Company to buy up the residue of road transport concerns in the Free State and to pay for those already acquired. No more capital would be raised than what was absolutely necessary.

A **Railway Waif.**—At the meeting of the Railway Club, on January 9, a paper was read by Mr. H. A. Vallance, entitled "The Story of a Railway Waif—The Invergarry and Fort Augustus Railway." Mr. Vallance traced the transport developments in the Great Glen of Scotland between Fort William and Inverness, the military roads constructed in the 18th century, later the Caledonian Canal, and finally the rival railway schemes supported by the North British or Highland Companies, which ended in a guarantee destroying any chance of through communication. The only outcome was the promotion of a line to connect Fort Augustus with the West Highland Railway at Spean Bridge. The lecturer described, with lantern slides, this line and its working, first by the Highland Railway and afterwards by the North British Railway.

**Road Accidents.**—The Ministry of Transport return for the week ended January 11 of persons killed or injured in road accidents is as follows. The figures in brackets are those for the corresponding period of last year :—

| | Killed, including deaths resulting from previous accidents | Injured |
|---|---|---|
| England ... | 93 (117) | 3,027 (2,874) |
| Wales ... ... | 8 (8) | 96 (114) |
| Scotland ... | 11 (12) | 278 (297) |
| | 112 (137) | 3,401 (3,285) |

The total fatalities for the previous week were 125, as compared with 159 for the corresponding period of 1934-5.

## British and Irish Traffic Returns

| GREAT BRITAIN | Totals for 2nd Week | | | Totals to Date | | |
|---|---|---|---|---|---|---|
| | 1936 | 1935 | Inc. or Dec. | 1936 | 1935 | Inc. or Dec. |
| L.M.S.R. (6,923 mls.) | £ | £ | £ | £ | £ | £ |
| Passenger-train traffic... | 358,000 | 355,000 | + 3,000 | 732,000 | 719,000 | + 13,000 |
| Merchandise, &c. ... | 452,000 | 429,000 | + 23,000 | 833,000 | 803,000 | + 30,000 |
| Coal and coke ... | 306,000 | 280,000 | + 26,000 | 564,000 | 500,000 | + 64,000 |
| Goods-train traffic ... | 758,000 | 709,000 | + 49,000 | 1,397,000 | 1,303,000 | + 94,000 |
| Total receipts ... ... | 1,116,000 | 1,064,000 | + 52,000 | 2,129,000 | 2,022,000 | + 107,000 |
| L.N.E.R. (6,336 mls.) | | | | | | |
| Passenger-train traffic... | 244,000 | 236,000 | + 8,000 | 511,000 | 496,000 | + 15,000 |
| Merchandise, &c. ... | 315,000 | 303,000 | + 12,000 | 599,000 | 580,000 | + 19,000 |
| Coal and Coke ... | 268,000 | 252,000 | + 16,000 | 487,000 | 455,000 | + 32,000 |
| Goods-train traffic ... | 583,000 | 555,000 | + 28,000 | 1,086,000 | 1,035,000 | + 51,000 |
| Total receipts ... ... | 827,000 | 791,000 | + 36,000 | 1,597,000 | 1,531,000 | + 66,000 |
| G.W.R. (3,750¼ mls.) | | | | | | |
| Passenger-train traffic... | 153,000 | 156,000 | — 3,000 | 319,000 | 315,000 | + 4,000 |
| Merchandise, &c. ... | 174,000 | 174,000 | — | 335,000 | 339,000 | — 4,000 |
| Coal and coke ... | 121,000 | 112,000 | + 9,000 | 236,000 | 213,000 | + 23,000 |
| Goods-train traffic ... | 295,000 | 286,000 | + 9,000 | 571,000 | 552,000 | + 19,000 |
| Total receipts ... ... | 448,000 | 442,000 | + 6,000 | 890,000 | 867,000 | + 23,000 |
| S.R. (2,154 mls.) | | | | | | |
| Passenger-train traffic... | 241,000 | 239,000 | + 2,000 | 485,000 | 476,000 | + 9,000 |
| Merchandise, &c. ... | 52,500 | 55,500 | — 3,000 | 102,500 | 106,500 | — 4,000† |
| Coal and coke ... | 35,500 | 31,500 | + 4,000 | 70,500 | 62,500 | + 8,000 |
| Goods-train traffic ... | 88,000 | 87,000 | + 1,000 | 173,000 | 169,000 | + 4,000 |
| Total receipts ... ... | 329,000 | 326,000 | + 3,000 | 658,000 | 645,000 | + 13,000 |
| Liverpool Overhead ... (6½ mls.) | 1,269 | 1,126 | + 143 | 2,448 | 2,220 | + 228 |
| Mersey (4½ mls.) ... | 4,487 | 4,276 | + 211 | 9,129 | 8,831 | + 298 |
| *London Passenger Transport Board ... | 553,000 | 526,200 | + 26,800 | 15,258,600 | 15,020,400 | + 238,200 |
| IRELAND | | | | | | |
| Belfast & C.D. pass. (80 mls.) | 1,931 | 2,011 | — 80 | 3,322 | 3,410 | — 88 |
| ,, ,, goods | 476 | 416 | + 60 | 638 | 640 | — 2 |
| ,, ,, total | 2,407 | 2,427 | — 20 | 3,960 | 4,050 | — 90 |
| †Great Northern pass. (543 mls.) | 8,200 | 7,750 | + 450 | 8,200 | 7,750 | + 450 |
| ,, ,, goods | 9,200 | 8,550 | + 650 | 9,200 | 8,550 | + 650 |
| ,, ,, total | 17,400 | 16,300 | + 1,100 | 17,400 | 16,300 | + 1,100 |
| †Great Southern pass. (2,076 mls.) | 18,834 | 18,548 | + 286 | 18,834 | 18,548 | + 286 |
| ,, ,, goods | 38,256 | 40,688 | — 2,432 | 38,256 | 40,688 | — 2,432 |
| ,, ,, total | 57,090 | 59,236 | — 2,146 | 57,090 | 59,236 | — 2,146 |

* 28th week; the receipts for which include those undertakings not absorbed by the L.P.T.B. in the corresponding period last year; last year's figures are, however, adjusted for comparative purposes
† 1st week.

## British and Irish Railways Stocks and Shares

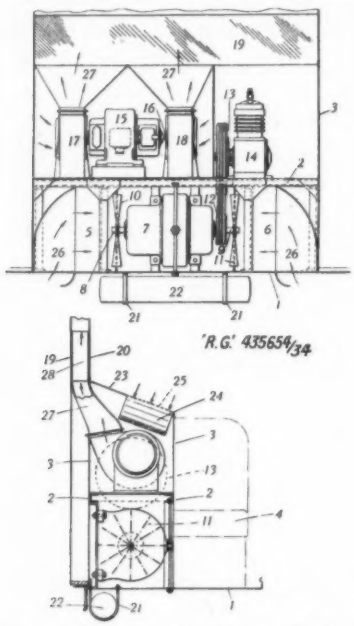
| Stocks | Highest 1935 | Lowest 1935 | Prices Jan. 15, 1936 | Prices Rise/Fall |
|---|---|---|---|---|
| G.W.R. | | | | |
| Cons. Ord. ... | 55½ | 44½ | 50 | +½ |
| 5% Con. Prefce. ... | 124 | 108 | 122½ | +3 |
| 5% Red.Pref.(1950) | 117 | 106¾ | 110½ | — |
| 4% Deb. ... ... | 118½ | 108 | 116½ | +1½ |
| 4½% Deb. ... | 122 | 110 | 117½ | +2 |
| 4½% Deb. ... | 129½ | 118 | 126½ | +1 |
| 5% Deb. ... ... | 140¼ | 130 | 137½ | +2 |
| 2½% Deb.... ... | 82¼ | 68½ | 76 | +2 |
| 5% Rt. Charge ... | 137 | 128 | 134½ | +1 |
| 5% Cons. Guar. ... | 136¾ | 120½ | 134½ | +1 |
| L.M.S.R. | | | | |
| Ord. ... ... | 25 5/16 | 16 | 18½ | +1 |
| 4% Prefce. (1923) | 58¼ | 43½ | 56½ | +2½ |
| 4% Prefce. ... | 87½ | 73½ | 84½ | +1½ |
| 5% Red.Pref.(1955) | 107 | 97¾ | 104½ | — |
| 4% Deb. ... ... | 110¼ | 99½ | 108½ | — |
| 5% Red.Deb.(1952) | 119 11/16 | 111 5/16 | 117½ | +1 |
| 4% Guar.... ... | 105⅝ | 95½ | 103½ | — |
| L.N.E.R. | | | | |
| 5% Pref. Ord. ... | 15⅞ | 8¼ | 10 | +½ |
| Def. Ord. ... ... | 7 9/16 | 4¾ | 5½ | — |
| 4% First Prefce.... | 74¾ | 48 | 57 | +½ |
| 4% Second Prefce. | 31⅜ | 16¼ | 20 | +1 |
| 5% Red.Pref.(1955) | 92¼ | 71 | 78½ | −1 |
| 4% First Guar. ... | 103 11/16 | 93 | 101½ | +1½ |
| 4% Second Guar. | 98¾ | 82½ | 93½ | +½ |
| 3% Deb. ... ... | 86 | 75 | 83 | — |
| 4% Deb. ... ... | 109¼ | 98½ | 107½ | — |
| 5% Red.Deb.(1947) | 118½ | 106½ | 115½ | +1 |
| 4½% Sinking Fund Red. Deb. | 112½ | 108 | 110 | — |
| SOUTHERN | | | | |
| Pref. Ord.... ... | 87½ | 69⅝ | 86 | +3 |
| Def. Ord. ... | 25 13/16 | 16¾ | 22 | +1½ |
| 5% Prefce. ... | 124 | 108¼ | 122½ | +2 |
| 5% Red.Pref.(1964) | 117¾ | 109½ | 115½ | +1 |
| 5% Guar. Prefce. | 136½ | 121½ | 134½ | — |
| 5% Red.Guar.Pref. (1957) | 121¼ | 112½ | 116½ | — |
| 4% Deb.... ... | 116¾ | 107 | 116 | +1 |
| 5% Deb. ... ... | 138 | 130¼ | 136½ | +1 |
| 4% Red. Deb. 1962–67 | 115 | 106½ | 115 | +1½ |
| BELFAST & C.D. | | | | |
| Ord. ... ... | 9 | 4 | 9 | — |
| FORTH BRIDGE | | | | |
| 4% Deb. ... ... | 111¼ | 104½ | 104½ | +1 |
| 4% Guar. ... | 109⅞ | 104 | 104½ | +1 |
| G. NORTHERN (IRELAND) | | | | |
| Ord. ... ... | 20 | 7 | 17 | — |
| G. SOUTHERN (IRELAND) | | | | |
| Ord. ... ... | 57½ | 14½ | 41 | +1¼ |
| Prefce. ... ... | 50 | 25¼ | 50½ | +¼ |
| Guar. ... ... | 88¾ | 51¼ | 88 | −½ |
| Deb. ... ... | 86¼ | 70 | 89 | +1½ |
| L.P.T.B. | | | | |
| 4½% "A" ... | 130 | 119¾ | 127 | +2½ |
| 5% "A" ... | 139¾ | 130 | 136½ | +1 |
| 4½% "T.F.A." ... | 113¾ | 108 | 109½ | — |
| 5% "B" ... | 131½ | 122¾ | 130½ | +1½ |
| "C" ... ... | 109½ | 91 | 111½ | +1½ |
| MERSEY | | | | |
| Ord. ... ... | 23⅛ | 9¼ | 29½ | — |
| 4% Perp. Deb. ... | 100½ | 93½ | 98½ | — |
| 3% Perp. Deb. ... | 75½ | 67 | 77 | — |
| 3% Perp. Prefce. | 62 | 47¼ | 66½ | +1 |

# ABSTRACTS OF RECENT PATENTS*

## No. 435,654. Improvements Relating to Air Conditioning Plant for use in Railway Coaches

*Eric Walter Baker, of 29, Manor Drive, Mill Hill, London N.W.7, and Arthur Thomas Hawkins, of 16, Selvage Lane, Mill Hill, London N.W.7. November 2, 1934.*

An air conditioning plant primarily intended for installation in any type of passenger vehicle, and more particularly in coaches used on underground



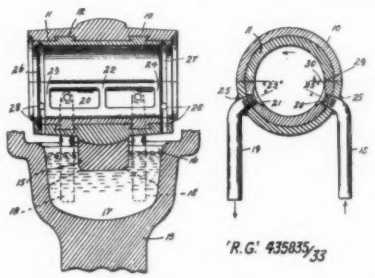

railways, is carried in part on the floor space 1 of a railway coach, while subframe members, mounted on this floor space carry another part of the apparatus. The whole plant is housed in a casing 3, and comprises two condensing coils 5 and 6, and an electric motor 7, from which extend two spindles 8 and 9. The spindle 8 carries a fan rotor 10, and the spindle 9 carries a fan rotor 11, and a grooved pulley 12. Belts connect the pulley 12 with a pulley 13 mounted on a compressor 14. The base plate 2 supporting the compressor also supports a second electric motor 15, with circulation fans 17, 18, connected to opposite ends of its rotating shaft 16. Secured below the floor 1 by straps 21 is a receiver chamber 22. Against the " roof " 23 of enclosure 3 is a set of cooling coils 24 past which air, to be conditioned, may be drawn through a grille 25. Air not requiring cooling passes into enclosure 3, by way of ducts 26. Conditioned air from the apparatus passes into the coach by way of ducts or trunks 27. In order to ensure a maximum effective window space in the coach, the trunks 27 merge at their point of exit into a single translucent trunk 28 formed by two spaced sheets of glass 19, 20, between which conditioned air may flow without obstructing the passage of light to the coach. The glass sheets 19, 20 extend adjacent to the roof of the coach, where they conduct the air to a metal trunk from which it is distributed to the coach space at suitable points through grilles.

A suitable refrigerant is introduced into the closed circuit constituted by compressor 14, cooling coils 24, condensing coils 5, 6, and connecting piping. This refrigerant is withdrawn in gaseous form from the cooling coils 24 and is compressed by the compressor 14 and forced into the coils 5 and 6 over which cool air is caused to flow by the fans 10, 11. The refrigerant is accordingly liquefied, and is passed to receiver 22, whence it is taken as required to cooling coils 24. The foul air to be conditioned passes into the plant through grille 25, over coils 24, by which it is cooled, and dried, and residual smoke or dirt removed. Fan rotors 10, 11 serve to deliver a blast of cool air on to condensing coils 5, 6 to assist in condensing the refrigerant gas to liquid form. The conditioned air passing from the plant is redelivered, with or without fresh air from without the coach, by way of trunks 27, 28, whence it may pass through metal conduit or trunking, to the coach interior through orifices formed in the roof.—(*Accepted, September* 25, 1935.)

## No. 435,835. Improvements in Horizontal Suction Bearings

*The British Thomson-Houston Co. Ltd., of Crown House, Aldwych, London, W.C.2. November* 16, 1933.

In horizontal suction journal bearings which prime themselves by the pumping action of the shaft in the bearing, oil or like lubricant drawn or sucked into the bearing through feed tubes or holes on the leading side of the journal, is distributed axially by means of grooves, and carried over the top of the journal to the other side, where some of it is discharged. Suction bearings of this kind may be used in sizes up to shaft diameters of the order of ten inches or over, and are particularly useful and advantageous in all cases where the shaft speed is either too low or too high to permit the use of rings for conveying oil from a container to the bearings. The bearing comprises a shell 10 made of cast iron or steel, and a liner 11, made of babbitt or like bearing metal. The liner may be cast on to the shell, and is provided with annular dovetail projections 12 held in corresponding grooves of the shell, which is supported on a pedestal 13 having a curved central portion 15 held by webs 16 on its outer wall. The central portion 15 engages a similar curved portion of the shell and permits slight angular movement of the bearing. The pedestal defines a compartment or container for containing the oil or lubricant 17. Connected into the boxes of the bearing are conduits 18 and 19 for conducting and discharging oil to the bearing. The oil is distributed in an axial direction through grooves 20, and collected in discharge grooves 21. In the particular arrangement shown, two grooves 20 are provided, defining a dam 22 and also dams 23 and 24 near each end of the bearing. In order to ensure airtight connections, the conduits 18 and 19 are screwed into radial boxes in the shell and liner, and are secured to the shell by fused metal. Leakage along the shaft is minimised by providing grooves 26 and 27 near each end of the bearing. Oil leaking sidewise is collected in these grooves and discharged through bores 28 into the oil container. The bearing is split along a horizontal plane through its axis into two halves or parts. As slight inaccuracies in the lining up of these parts may occur, it is advantageous to chamfer the edges 29 of the liner at the split. Without these chamfers and the edge of the upper half slightly overhanging the edge of the lower half, a scraper action would take place which would reduce the oil flow. The chamfers end near the grooves 26 and 27. The strip 30 of the bearing




metal defined between the split and the suction grooves 20 should be left untouched after the bearing has been bored in order to minimise the harmful effect of any air leakage at the split where an airtight joint is greatly desirable. The oil level in the container is preferably maintained higher than the level in a corresponding ring oil bearing to reduce the required suction head to a minimum. During operation, lubricant is conducted from the oil compartment through the suction conduits 18 into the grooves 20, whence the lubricant is carried over the top of the shaft, collected in the grooves 21 and partly discharged through the discharge conduits 19. A portion of the lubricant is forced into the lower bearing portion, that is, the load-carrying portion, where it forms a film between the shaft and the bearing.—(*Accepted September* 30, 1935.)

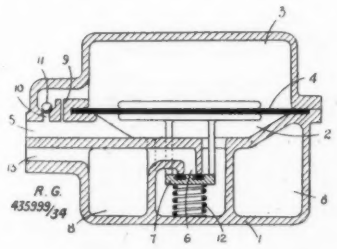
* These abridgments of recently published specifications are specially compiled for THE RAILWAY GAZETTE by permission of the Controller of His Majesty's Stationery Office. Group abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, either sheet by sheet as issued, on payment of a subscription of 5s. a group volume, or in bound volumes, price 2s. each, and the full specifications can be obtained from the same address price 1s. each.

### No. 435,999. Improvements in Fluid Pressure Braking Apparatus

*John Wills Cloud, and the Westinghouse Brake and Saxby Signal Co. Ltd. both of* 82, *York Road, King's Cross, London, N.*1. *March* 29, 1934.

A fluid pressure braking apparatus comprises a train pipe extending throughout the train of vehicles, and a triple or distributing valve device located on each vehicle actuated so as to effect an application or release of the brakes in response to variations in train pipe pressure. This valve device comprises a casing 1 divided into two chambers 2 and 3 by a diaphragm 4, the chamber 2 being in permanent communication through a passage 5 with the train pipe (not shown), and also connected through a passage 6, communication through which is controlled by a poppet valve 7, actuated by the diaphragm 4, with an accelerating chamber 8. The chamber 3 of the device is in communication with the train pipe or chamber 2 through a relatively restricted port 9, and also through a larger port 10, in which is located a non-return valve 11, permitting flow of fluid only from the chamber 2 to the chamber 3. As long as the pressures on opposite sides of the diaphragm are equal, the poppet valve 7 remains seated so as to cut off communication between the train pipe and the accelerating chamber 8, a light spring 12 tending to maintain the valve 7 seated. When fluid under pressure is supplied to the train pipe in charging the braking system, the valve 7 is held seated by the spring 12, and fluid flows through the passage 5 to the chamber 2, and to the chamber 3 by means of the restricted port 9, and through the larger port 10 past the non-return valve 11 until, when the braking system is fully charged, the pressures on opposite sides of the diaphragm 4 are substantially equal, and the van valve element is held seated by the spring 12.

When the train pipe pressure is reduced in order to effect an application of the brakes, the pressure in the chamber 2 is reduced and the diaphragm 4 is moved downwardly by the pressure in the chamber 3 so as to unseat the

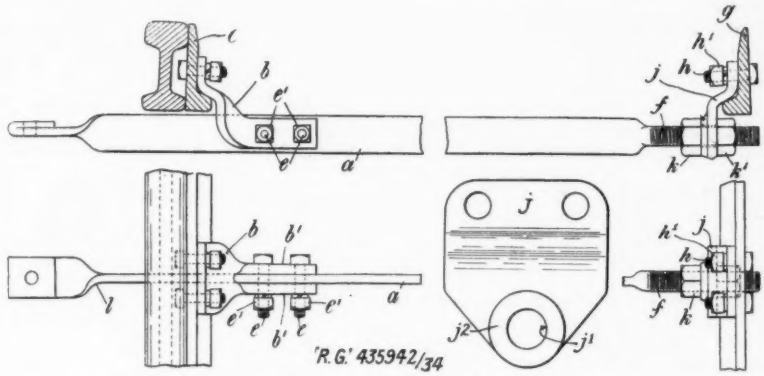



poppet valve 7 and establish communication between the chamber 2 and the accelerating chamber 8. Fluid under pressure thereupon flows rapidly from the train pipe through the passage 5, chamber 2 and passage 6 to the accelerating chamber, and as soon as the pressures in the chambers 2 and 3 have equalised through the restricted port 9, the poppet valve 7 will again be seated by the spring 12, thus cutting off communication between the train pipe and the accelerating chamber 8. The device 1 is made as sensitive as possible to variations in train pipe pressure by employing the diaphragm 4 and poppet valve 7. The device is arranged to respond to a relatively small reduction in train pipe pressure, usually somewhat greater than that due to leakage of fluid from the train pipe. The poppet valve is urged towards its seat by the relatively light spring 12, or by selecting a suitable area of the poppet valve with respect to the area of the diaphragm.—(*Accepted September* 30, 1935.)

### No. 435,942. Improvements in Stretcher Bars for Railway Switches

*Henry Williams Limited, and David Williams, both of Railway Appliances Works, Darlington. June* 7, 1934.

This patent relates to a stretcher bar for railway switches, and particularly to bars of the type formed of spring metal such that when mounted they are rigid in the vertical plane, and resilient in the horizontal plane. It is usual practice to stock several sizes of stretcher bars to meet the requirements of the several switch sizes, but these stretcher bars are adjustable, and thus overcome this objection. The stretcher bar *a* is formed of rectangular cross-section spring steel so as to give the required resilience. To one end of the bar a flanged bracket *b* is bolted which is formed to bear against a switch blade *c*, and further bent to form two lugs $b^1$, $b^1$ which enclose the stretcher bar and are bolted to it by means of bolts *e* and nuts $e^1$. The other end of the stretcher bar is of round cross section *f*, screw-threaded to a sufficient length to allow of adjustment. Secured to the other switch blade by means of bolts *h* and nuts $h^1$ is a lug *j* provided with an eye $j^1$ reinforced with a boss $j^2$ which is secured to the stretcher bar by means of two nuts *k* and $k^1$, one on each side of the reinforced bearing $j^2$. In fitting the stretcher bar, the flanged bracket *b* is bolted to one of the switch blades, the lug *j* with the screw-threaded end of the bar inserted through the eye being secured to the other blade. The nuts *k* and $k^1$ are then tightened up and adjusted so as to obtain the required effective length of the stretcher bar. In this way one standard stretcher bar may be adapted for use with any of the several switch blades used.—(*Accepted October* 2, 1935.)




## COMPLETE SPECIFICATIONS ACCEPTED

435,405. Ramsden, H. K., and Associated Electrical Industries Limited. Control of electric motors in traction systems.

435,445. Rudd, J. Prevention of rail creep on railways and tramways.

435,507. Hansen, H., and Rosenthal, K. G. Rail locomotives, rail tractors, or similar rail vehicles, and internal-combustion engines therefor.

435,508. Knorr-Bremse A.G. Electromagnetic track brakes.

435,509. Knorr-Bremse A.G. Electromagnetic track brakes.

435,638. Bateman, W. H., and Wickman, Limited, A. C. Lubricated bearings.

435,720. Metropolitan-Cammell Carriage Wagon & Finance Co. Ltd., and Bailey, G. H. Construction of railway wagons.

435,836. Knorr-Bremse A.G. Electromagnetic track brakes.

435,953. Oxweld Railroad Service Company. Method of building up rails, and built-up rails formed thereby.

436,253. Davies, M. Device for locking the chair keys or wedges of railway rails.

436,313. Sams, J. G. B. Fixed signal apparatus controlling train movements between main lines, sidings, loops, and the like.

436,449. Livsey, D. M. (Waylen, D. C.). Brake apparatus for railway and like vehicles.

436,530. Sandberg, C. P., Sandberg, O. F. A., and Sandberg, O. F. A. (legal representative of Sandberg, N. P. P. (deceased)). Heat-treatment of steel tyres or wheels.

436,573. Reidinger, A. Steam locomotives.

436,614. Dehn, F. B. (Zeiss Ikon A. G.). Apparatus for recording or indicating the movements of the moving parts of engines.

436,646. Blage, M., and Soc. des Hauts-Faurneaux de la Chiers. Railway rail joints.

436,749. McLintock, J. Bearings of vehicle wheels.

# CONTRACTS AND TENDERS

Cowans, Sheldon & Co. Ltd. has received an order from the Rohilkund & Kumaon Railway for one metre-gauge 15-ton steam breakdown crane, to be supplied to the inspection of Messrs. Rendel, Palmer & Tritton.

### Diesel Locomotive and Railcar Orders

The Drewry Car Co. Ltd. has received repeat orders from the Eagle Oil & Shipping Co. Ltd. for two 0-4-0 and two 0-6-0 Gardner-engined diesel shunting locomotives, similar in all respects to locomotives previously supplied to this customer.

The Drewry Car Co. Ltd. has also received an order from the New Zealand Government for six locomotives of the 0-4-0 type, similar to the above, but fitted with Parsons four-cylinder petrol engines developing 75-b.h.p. at 1,600 r.p.m.

The Drewry Car Co. Ltd. has also in hand a light diesel locomotive for use in Assam and is just completing a diesel passenger railcar for service at the War Department's Railway Training Centre at Longmoor Camp.

W. & T. Avery Limited has received an order from the Buenos Ayres Western Railway for ten portable platform weighing machines.

Beyer Peacock & Co. Ltd. has received an order from the Jodhpur Railway for one portable piston valve liner boring machine.

Ruhrstahl A.G. has received an order for 12 pairs of carriage and wagon wheels and axles for the Gaekwar's Baroda State Railway, to the inspection of Messrs. Rendel, Palmer & Tritton.

The Consolidated Brake & Engineering Co. Ltd. has received orders for vacuum brake apparatus as follows: 500 sets for goods wagons being built for the South African Railways & Harbours Board by Belgian firms; 92 sets for wagons for the Nizam's State Railways; and 50 sets for vestibuled brake coaches for the L.M.S.R.

The Madras & Southern Mahratta Railway Administration has placed the following orders to the inspection of Messrs. Rendel, Palmer & Tritton :—

Usines et Acieries Allard, 300 carriage and wagon axleboxes.
Clyde Rubber Works Limited, 428 hosepipes and 5,000 indiarubber springs.
Vacuum Brake Co. Ltd., Vacuum brake fittings.
Wm. Beardmore & Co. Ltd., 72 pairs of carriage and wagon wheels and axles.
Skoda Works, 600 carriage and wagon tyres.
J. Baker & Bessemer Limited, 82 tyres.
Turton, Platts Limited, 160 buffer casings for carriages and wagons.
Talbot Stead Tube Co. Ltd., boiler and flue tubes.
John Walsh & Co. (Birmingham) Ltd., panel plates.

The Argentine State Railways Administration is calling for tenders, to be presented in Buenos Aires by February 27, for the supply, erection and painting of a steel span, bearers and accessories for a bridge. Further particulars of this call for tenders may be obtained by firms desirous of offering steelwork of United Kingdom manufacture upon application to the Department of Overseas Trade. Reference number T.Y. 5638 should be quoted.

Linley & Co. Ltd. has received orders from the South Indian Railway Administration to the inspection of Messrs. Robert White & Partners, for five copper firebox plates, each 17 ft. by 10 ft., and 13½ tons of bolts, nuts and screws.

The Chinese Government Purchasing Commission has placed the following orders for equipment for the Canton-Hankow Railway, to be supplied to the inspection of Messrs. Sandberg :—

British (Guest, Keen, Baldwins) Iron & Steel Co. Ltd., 30,000 steel sleepers, 247,500 pinch plates and 60,000 fishplates.
Dorman Long & Co. Ltd., 50,000 steel sleepers and 247,500 pinch plates.
Colvilles Limited, 20,000 steel sleepers.
Chas. Richards & Sons Ltd., 480,000 tee bolts and nuts.

The Chinese Government Purchasing Commission has placed the following orders for equipment required for the Canton-Hankow Railway, to be supplied to the inspection of Messrs. Fox & Mayo :—

Ashworth, Son & Co. Ltd., 24 portable platform weighing machines.
Cowans, Sheldon & Co. Ltd., two hand-operated locomotive hoists.
Henry Berry & Co. Ltd., two wheel-drop pit jacks.
R. C. Gibbins & Co. Ltd., eight 50-ton traversing screw jacks.
Fellows Bros. Ltd., 12 30-ton traversing screw jacks.
James Gilbert & Co. Ltd., 16 15-ton rack and pinion jacks.
Lamp Manufacturing & Railway Supplies Limited, 12 car replacing jacks.
Edge & Sons Ltd., 52 lengths of crane chain.
Wm. Archdale & Son, one radial drilling machine.
Graham & Normanton, through Lawler Ayres & Co. Ltd., one shaping machine.
Reiss Bros. Ltd., two electric arc welding plants and two warm water locomotive boiler wash out plants.
Alldays & Onions Limited, smith's hearths and patent forges.
A. Balfour & Co. Ltd., twist drills and reamers.
Easton & Johnson Limited, two 25 kW steam engine generator sets and two Spencer Hopwood water-tube boilers.
Stewarts and Lloyds Limited, wrought iron tubing and couplers.

United Water Softeners Limited has received an order from the Cordoba Central Railway for four Zerolit water softening plants of various capacities.

The East Indian Railway Administration has placed the following orders :

Associated British Machine Tool Makers Limited, one electrically-driven Crow-Hamilton No. 3S tube scaling machine.
Machine Tools (India) Limited, one No. 3 Milwaukee plain milling machine.
Alfred Herbert (India) Limited, one Herbert No. 16U universal milling machine.

The Government of Mysore has recently placed the following orders :—

Alfred Herbert (India) Limited, One hacksaw machine, and one Wageor tube expander.
Alfred Herbert Limited, London, One boiler riveting machine.
Kitchen & Wade Limited, Two drilling machines.
Henry Pels & Co. Ltd., One hand lever shearing machine and one punching machine.
Consolidated Pneumatic Tool Co. Ltd., One sealing hammer.
A.I. Electric Welding Appliance Company, One electrical butt welding plant to weld boiler tubes.

Leyland Motors Limited has received the following orders : London Passenger Transport Board, 170 trolleybuses; Sunderland and District Omnibus Co. Ltd., four oil-engined Tigers; Southdown Motor Services Limited, three Tiger passenger vehicles; and Northern Ireland Road Transport Board, four oil-engined Beaver Six vehicles.

Leyland Motors Limited has also received orders from the Central S.M.T. Co. Ltd. for six Tiger passenger vehicles, and from the Ripponden & District Motor Services Limited for two Tiger passenger vehicles, one having a trailing axle.

The Superheater Co. Ltd. has received an order from the Bengal-Nagpur Railway for a number of superheater headers.

Hurst, Nelson & Co. Ltd. has received an order for three bogie carriage underframes, complete with wheels and axles, for the Mysore State Railways.

La Brugeoise et Nicaise et Delcuve has received an order from the Mysore State Railways, to the inspection of Messrs. Rendel, Palmer & Tritton, for 20 four-wheeled bogie trucks for carriage stock, complete with wheels and axles.

The Pennsylvania Railroad announces the placing of orders for 10,000 new freight cars, to cost approximately $25,000,000, marking the inauguration of one of the most important and extensive equipment building programmes ever undertaken in the company's history. Of the new cars, 6,000 will be built in the railway's own shops, 3,300 being assigned to the Altoona works, 1,350 to the Enola, Pa., shops, and 1,350 to the Pitcairn, Pa., shops. The remaining 4,000 cars have been allocated to equipment building companies as follow: American Car & Foundry Company, 800; Bethlehem Steel Company, 600; General American Car Company, 400; Greenville Steel Car Company, 250; Pressed Steel Car Company, 1,000; Pullman Standard Car Manufacturing Company, 700; and Ralston Steel Car Company, 250. To assist in financing the building of the new cars, the Pennsylvania Railroad has asked bids from a number of banking firms, on $18,420,000 of equipment trust certificates. The remainder of the cost of the cars will be met by the company out of its own funds. A feature of the invitations is that the bidders are asked to quote prices on certificates bearing either 3 per cent. or 2¾ per cent., the final choice of rate to lie with the company. Any award will be subject to approval by the Interstate Commerce Commission.

The East Indian Railway Administration is inquiring for tenders receivable at 105, Clive Street, Calcutta, by February 3, for the supply of 20,000 broad-gauge steel sleepers for 115 lb. F.F.B.S. rails.

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B.S.S. FOR BITUMEN ROAD EMULSION.—The British Standard Specification 434 of 1931 for asphaltic bitumen road emulsion for penetration and surface dressing has been revised, and is now designated No. 434-1935. It may be obtained from the British Standards Institution, 28, Victoria Street, London, S.W.1, price 2s. 2d. post free.

# OFFICIAL NOTICES

APPLICATIONS are invited for the following temporary appointments in Railway Engineer's Offices in London and other centres :—

(*a*) Draughtsmen, experienced in surveying, designing, and detailing steel structures for road and railway bridge works.

(*b*) Draughtsmen, thoroughly competent in up-to-date design and detailing of reinforced concrete, brick, steel and timber structures for railway works.

(*c*) Draughtsmen, thoroughly competent in railway surveying, designing permanent way lay-outs, structures in brick, steel and timber.

(*d*) Draughtsmen, architectural, thoroughly competent in up-to-date design and construction, preparation of working drawings, details, surveys and specifications.

(*e*) Draughtsmen, fully qualified in British Railway signalling practice, mechanical and electrical, experienced in interlocking and design of electric signalling circuits.

Salary will depend on qualifications and experience.

Applications, stating age, qualifications and experience, with copies of testimonials, to Box No. 12, c/o THE RAILWAY GAZETTE, 33, Tothill Street, London, S.W.1.

## Crown Agents for the Colonies

COLONIAL GOVERNMENT APPOINTMENTS.

APPLICATIONS from qualified candidates are invited for the following post :—

ASSISTANT ENGINEER required by the Government of the Gold Coast for the Railway Department for two tours of 12 to 18 months, with possible permanency. Salary £480 a year for three years, then £510-30-£720-40-£920 a year. Free passages and quarters and liberal leave on full salary. Candidates, aged 25-35, must be Corporate Members of the Institution of Civil Engineers and should have served a pupilage with a Railway Engineer, Firm of Civil Engineers or Railway Engineering Contractors. They must have had practical experience in railway maintenance, surveying and the preparation of drawings and estimates. Preference will be given to candidates who have had, in addition to the above qualifications, practical experience in the maintenance of harbours.

Apply at once by letter, stating age, whether married or single and full particulars of qualifications and experience and mentioning this paper to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting M/4067.

## OFFICIAL ADVERTISEMENTS.

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Thursday. All advertisements should be addressed to :—*The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.



# Railway and Other Reports

**Buenos Ayres & Pacific Railway.**—One half-year's arrears of interest to December 31, 1934, less tax, will be paid on February 14 on the 4½ per cent. second debenture stock.

**Argentine Great Western Railway.**—The directors announce the payment on February 14 of one half-year's arrears of interest to December 31, 1934, less tax, on the 4 per cent. irredeemable second debenture stock.

**Glyn, Mills & Co.**—The 103rd statement of assets and liabilities as at December 31, 1935, of this famous private bank shows the continuing strength of its position. The proportion of quickly realisable assets to the deposits of £38,200,591 is over 76 per cent. These assets consist of cash, £5,956,185 ; balances with other banks and cheques in transit, £2,195,723 ; money at call and short notice, £8,733,300 ; bills discounted, £542,004 ; and investments, £11,879,161, including £10,903,646 British Government securities. Advances to customers, &c., amount to £10,014,218, and bank premises at cost, less amounts written off, stand at £740,000. Total assets are £41,594,173. The total capital authorised and issued is £1,060,000, and the reserve fund stands at £530,000.

**Highland Transport Co. Ltd.**—For the six months ended September 30, 1935, this company in which the L.M.S.R. holds 50 per cent. of the issued capital, showed a profit of £7,630, against £7,509 for the corresponding period of 1934. After allowing for depreciation, directors' fees for 1934-35, and half of the loss on realisation of the assets of the Skye section, there remains a credit balance of £590. The directors recommend payment of a dividend of 2 per cent. (against 3 per cent.), which will absorb £543, leaving £47 to be carried forward. The sale of the Skye business for £4,500 has been carried through, and a petition presented to the Court of Session to authorise reduction of capital and the repayment to shareholders of 3s. a share. It is anticipated that this petition will shortly be granted and payment made. Results for the past six months show a considerable improvement, and the directors anticipate that, being relieved of the Skye business, the company will obtain more satisfactory results in the future. It was decided a year ago to alter the close of the financial year from March 31 to September 30. The capital issued consists of 35,000 ordinary shares of £1 each.

**Scottish Motor Traction Co. Ltd.**—The report of this company, in which the L.M.S. and L.N.E. Railway Companies have each a large shareholding, shows that the profit for the year ended October 31, 1935, after providing for depreciation and income tax, and including dividends from subsidiary companies, amounted to £178,309, compared with £163,789 for 1933-34. The dividend on the 6½ per cent. cumulative preference shares takes £50,375 (against £49,905), leaving a balance of £127,934 (against £113,884) out of which the directors have allocated £20,609 (against £24,001) to contingency reserve and £37,000 (against £25,000) to general reserve. They recommend payment of a dividend on the ordinary shares at the rate of 10 per cent. per annum (the same), which absorbs £66,528 (against £62,198), leaving a balance of £3,797. This balance, added to £60,081 brought in, the directors propose to carry forward. Numerous competitive businesses have been acquired by this group of companies during the year, the largest being the Fife Tramway Light & Power Company, which controls the Falkirk & District Traction Company and the Dunfermline & District Traction Company.

# Forthcoming Events

Jan. 17 (*Fri.*).—Institute of Transport (Leeds Graduate), at Leeds Transport Department, 7 p.m. "Rolling Stock," by Mr. F. Beebe.

Jan. 20 (*Mon.*).—G.W.R. (Birmingham) Lecture and Debating Society, at Great Western Hotel, Snow Hill Station, 6.30 p.m. "Some Features in the Construction of G.W.R. Locomotives," by Mr. H. Johnson.

Institute of Transport (Scottish), at Grosvenor Restaurant, Glasgow, 7.15 p.m. Representation of a Traffic Commissioner's Court.

Jan. 21 (*Tues.*).—Institute of Transport (London), at Inst. of Electrical Engineers, Savoy Place, W.C.2, 6 p.m. "The Decisive Influence of Ports on Shipping and Inland Traffic Development," by Mr. C. Dove.

Institution of Locomotive Engineers (Manchester), at Literary Society, 36, George Street, 7 p.m. "Railcars in Service in Northern Ireland," by Mr. A. Allen.

L.N.E.R. (Middlesbrough) Lecture and Debating Society, at Cleveland Scientific Inst., Corporation Road, 7.15 p.m. "Southampton Docks," by Mr. Richards.

Jan. 22 (*Wed.*).—Institution of Railway Signal Engineers, at Inst. of Electrical Engineers, Savoy Place, London, W.C.2, 6 p.m. "Design, Manufacture and Examination of Mechanical Signalling Apparatus," by Mr. P. Hardman.

Jan. 23 (*Thurs.*).—G.W.R. (London) Lecture and Debating Society, in General Meeting Room, Paddington Station, 5.45 p.m. Reading and Discussion of Prize Essay.

Institution of Locomotive Engineers (Scottish), at Royal Technical College, George Street, Glasgow, 7.30 p.m. "The Track *v.* The High Speed Locomotive," by Mr. R. Peters.

Jan. 24 (*Fri.*).—Institute of Transport (Manchester-Liverpool), at New Central Library, Manchester, 6.30 p.m. "Co-ordination of Municipal Transport Services," by Mr. A. Gledhill.

Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, 6 p.m. General Meeting.

Jan. 25 (*Sat.*).—Permanent Way Institution (London), at Maison Lyons, Shaftesbury Avenue, W.1, 6.30 p.m. Annual Winter Dinner.

Jan. 27 (*Mon.*).—Institution of Mechanical Engineers (Graduate), Storey's Gate, London, S.W.1, 6.45 p.m. "Fluid Joints," by Mr. V. Yardley.

Stephenson Locomotive Society (Scottish), at Royal Technical College, George Street, Glasgow, 7.45 p.m. "The David Jones Locomotives of the Highland Railway," by Mr. K. Cameron.

# Railway Share Market

The stock and share markets have continued firm under the influence of the good overseas' trade figures. There was a tendency in the Stock Exchange for more favourable views to be taken of the dispute in the coal industry and buyers were more readily forthcoming for the junior and, necessarily, more speculative home railway stocks. Southern preferred had a big jump on Tuesday and again on Wednesday on reports that the House of Lords decision in regard to the rating appeal would be made known to-day.

The market is apparently confident that the decision will uphold the greater part of the reduced assessment of the Southern Railway and on this view the preferred ordinary stock of the company was bid for at several points higher than a week ago. It has already been stated that if the decision is favourable it is estimated that the company would be able to pay the full 5 per cent. on the preferred stock if the directors consider it expedient. The traffic returns on Wednesday were satisfactory but the market effect on the London & North Eastern junior stocks was regarded as disappointing. Two stocks outside of the normally active descriptions have continued to attract attention. The "C" stock of the London Transport Passenger Board is being absorbed in substantial lines by investors who look for an earlier increase in the dividend than had been anticipated. In comparison with other stocks of equivalent rank in the home railway market the yield is a very high one on the assumption that 5 per cent. will be earned from operation this year. There is in addition a substantial revenue coming in from advertising and other sources. The other stock is the Mersey ordinary stock which had a further big jump and early this week marked at 30 against less than 10 at one time last year.

The buying is not due to dividend prospects as the stock only received ¾ per cent. for 1934 and is not exected to get more than one per cent. for 1935 but there are persistent rumours in the Stock Exchange that a scheme is in contemplation for merging the railway in a Liverpool Transport scheme similar to that of London. Foreign railway stocks were quiet and the announcement of payment of half-year's interest on B.A. Pacific and Argentine Great Western second debentures failed to stimulate prices.

## Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

| | Railways | Miles open 1935-36 | Week Ending | Traffics for Week: Total this year | Traffics for Week: Inc. or Dec. compared with 1935 | No. of Weeks | Aggregate Traffics to Date: Totals: This Year | Aggregate Traffics to Date: Totals: Last Year | Aggregate Traffics to Date: Increase or Decrease | Shares or Stock | Prices: Highest 1935 | Prices: Lowest 1935 | Prices: Jan. 15, 1936 | Yield % (See Note) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | £ | £ | | £ | £ | £ | | | | | |
| South & Central America. | Antofagasta (Chili)&Bolivia | 830 | 12.1.36 | 18,180 | + 7,830 | 2 | 23,100 | 17,750 | + 5,350 | Ord. Stk. | 23 | 14 15/16 | 20 1/2 | Nil |
| | Argentine North Eastern | 753 | 11.1.36 | 5,852 | — 1,073 | 28 | 222,938 | 207,077 | + 15,861 | ,, | 7 | 4 | 6 | Nil |
| | Argentine Transandine | — | — | — | — | — | — | — | — | A. Deb. | 49 1/2 | 30 | 46 | 8 11/16 |
| | Bolivar | 174 | Dec., 1935 | 4,700 | — 1,000 | 52 | 71,300 | 71,400 | — 100 | 6 p.c. Deb. | 13 | 5 | 10 | Nil |
| | Brazil | — | — | — | — | — | — | — | — | Bonds. | 14 | 11 | 13 | 3 15/16 |
| | Buenos Ayres & Pacific | 2,806 | 11.1.36 | 86,075 | + 15,652 | 28 | 2,116,083 | 1,924,091 | + 191,992 | Ord. Stk. | 101 1/2 | 47/8 | 71/2 | Nil |
| | Buenos Ayres Central | 190 | 28.12.35 | $107,100 | + $21,800 | 26 | $3,141,100 | $3,116,100 | + $25,000 | Mt. Deb. | 21 | 10 | 13 | Nil |
| | Buenos Ayres Gt. Southern | 5,085 | 11.1.36 | 131,962 | — 35,409 | 28 | 3,382,334 | 3,494,061 | — 111,727 | Ord. Stk. | 27 | 13 1/2 | 17 1/2 | Nil |
| | Buenos Ayres Western | 1,930 | 11.1.36 | 49,765 | + 6,338 | 28 | 1,166,895 | 1,166,059 | + 836 | ,, | 24 | 10 | 14 | Nil |
| | Central Argentine | 3,700 | 11.1.36 | 129,166 | + 1,496 | 28 | 3,300,715 | 3,221,128 | + 79,587 | ,, | 17 7/8 | 7 | 11 1/2 | Nil |
| | Do. | — | — | — | — | — | — | — | — | Dfd. | 9 | 3 1/4 | 5 1/2 | Nil |
| | Cent. Uruguay of M. Video | 273 | 4.1.36 | 10,727 | + 1,528 | 27 | 274,536 | 422,461 | — 147,925 | Ord. Stk. | 8 1/2 | 3 | 5 | Nil |
| | Do. Eastern Extn. | 311 | 4.1.36 | 1,960 | + 109 | 27 | 45,619 | 48,629 | — 3,010 | | — | — | — | — |
| | Do. Northern Extn. | 185 | 4.1.36 | 1,435 | + 380 | 27 | 32,868 | 26,502 | + 6,366 | | — | — | — | — |
| | Do. Western Extn. | 211 | 4.1.36 | 801 | + 22 | 27 | 20,968 | 20,503 | + 465 | | — | — | — | — |
| | Cordoba Central | 1,218 | 11.1.36 | 24,910 | — 3,320 | 28 | 831,620 | 831,050 | + 570 | Ord. Inc. | 4 | 1 | 2 | Nil |
| | Costa Rica | 188 | Oct., 1935 | 11,634 | — 2,012 | 17 | 55,349 | 63,485 | — 8,136 | Stk. | 35 | 30 | 34 | 5 7/8 |
| | Dorada | 70 | Nov., 1935 | 13,300 | + 2,900 | 48 | 130,700 | 112,800 | + 17,900 | 1 Mt. Db. | 103 5/8 | 102 1/2 | 102 1/2 | 5 7/8 |
| | Entre Rios | 810 | 11.1.36 | 8,549 | — 7,583 | 28 | 316,738 | 344,807 | — 28,069 | Ord. Stk. | 15 | 6 1/2 | 9 | Nil |
| | Great Western of Brazil | 1,082 | 11.1.36 | 10,500 | — 600 | 2 | 15,100 | 17,700 | — 2,600 | Ord. Sh. | 1/2 | 5/16 | 1/2 | Nil |
| | International of Cl. Amer. | 794 | Dec., 1935 | $458,840 | + $47,975 | 52 | $4,717,930 | $4,722,778 | — $4,848 | | — | — | — | — |
| | Interoceanic of Mexico | — | — | — | — | — | — | — | — | 1st Pref. | 1/2 | 3/32 | 1/2 | Nil |
| | La Guaira & Caracas | 22 1/4 | Dec., 1935 | 4,200 | + 1,000 | 52 | 45,345 | 42,350 | + 2,995 | Stk. | 8 1/2 | 8 | 8 1/2 | Nil |
| | Leopoldina | 1,918 | 11.1.36 | 19,559 | + 267 | 2 | 30,317 | 32,029 | — 1,712 | Ord. Stk. | 8 1/2 | 2 1/2 | 8 1/2 | Nil |
| | Mexican | 483 | 7.1.36 | $205,100 | + $13,600 | 1 | $205,100 | $191,500 | + $13,600 | ,, | 1 1/2 | 1/4 | 3/4 | Nil |
| | Midland of Uruguay | 319 | Nov., 1935 | 8,356 | — 5,180 | 22 | 30,701 | 52,325 | — 21,624 | ,, | 1 1/2 | 1 1/2 | 1 1/2 | Nil |
| | Nitrate | 401 | 31.12.35 | 8,685 | + 2,130 | 52 | 155,267 | 135,619 | + 19,648 | Ord. Sh. | 64/- | 42/- | 25 3/8 | Nil |
| | Paraguay Central | 274 | 11.1.36 | $2,144,000 | + $1,141,000 | 28 | $57,965,000 | $27,843,000 | + $39,122,000 | Pr. Li. Stk. | 80 1/2 | 60 | 76 1/2§ | 7 13/16 |
| | Peruvian Corporation | 1,059 | Dec., 1935 | 78,507 | + 16,529 | 26 | 454,297 | 371,516 | + 82,781 | Pref. | 10 5/8 | 6 7/16 | 10 | Nil |
| | Salvador | 100 | 4.1.36 | ¢23,900 | — ¢5,700 | 27 | ¢381,896 | ¢359,152 | + ¢22,744 | Pr. Li.Db. | 65 | 61 | 65 | 7 11/16 |
| | San Paulo | 153 1/2 | 5.1.36 | 26,032 | + 6,316 | 1 | 26,032 | 19,716 | + 6,316 | Ord. Stk. | 80 | 35 | 55 | 4 9/16 |
| | Taltal | 164 | Dec., 1935 | 4,055 | + 1,915 | 26 | 20,700 | 13,570 | + 7,130 | Ord. Sh. | 11 1/16 | 1 1/8 | 1 3/8 | 7 1/4 |
| | United of Havana | 1,353 | 11.1.36 | 15,439 | — 1,632 | 28 | 430,577 | 451,214 | — 20,637 | Ord. Stk. | 3 1/16 | 1 | 2 | Nil |
| | Uruguay Northern | 73 | Nov., 1935 | 1,106 | — 216 | 22 | 3,633 | 5,766 | — 2,133 | Deb. Stk. | 4 1/2 | 2 15/16 | 4 1/2 | Nil |
| Canada. | Canadian National | 23,684 | 7.1.36 | 516,863 | + 29,546 | 1 | 516,863 | 487,317 | + 29,546 | — | — | — | — | — |
| | Canadian Northern | — | — | — | — | — | — | — | — 4 p.c. | Perp. Dbs. | 78 5/8 | 52 1/2 | 64 1/2 | 6 5/16 |
| | Grand Trunk | — | — | — | — | — | — | — | — | 4 p.c. Gar. | 103 5/8 | 93 | 101 1/2 | 3 15/16 |
| | Canadian Pacific | 17,224 | 7.1.36 | 403,200 | + 33,800 | 1 | 403,200 | 369,400 | + 33,800 | Ord. Stk. | 14 1/16 | 8 3/4 | 11 1/2 | Nil |
| India.† | Assam Bengal | 1,329 | 29.12.35 | 38,662 | + 817 | 38 | 894,676 | 1,020,190 | — 125,514 | Ord. Stk. | 92 1/8 | 77 1/2 | 82 1/2 | 3 5/8 |
| | Barsi Light | 202 | 20.12.35 | 3,907 | + 630 | 38 | 101,175 | 103,275 | — 2,100 | Ord. Sh. | 105 | 77 1/2 | 77 1/2 | 6 7/16 |
| | Bengal & North Western | 2,112 | 20.12.35 | 71,056 | — 6,829 | 38 | 545,359 | 543,154 | + 2,205 | Ord. Stk. | 301 1/2 | 291 | 293 1/2 | 5 7/16 |
| | Bengal Dooars & Extension | 161 | 20.12.35 | 3,729 | — 555 | 38 | 102,739 | 114,617 | — 11,878 | ,, | 127 1/2 | 122 | 123 1/2 | 5 11/16 |
| | Bengal-Nagpur | 3,268 | 30.11.35 | 178,875 | + 8,849 | 34 | 4,202,711 | 3,848,353 | + 354,358 | ,, | 105 | 100 5/16 | 101 1/2 | 3 15/16 |
| | Bombay, Baroda & Cl. India | 3,072 | 31.12.35 | 256,200 | — 23,475 | 39 | 5,954,025 | 5,973,900 | — 19,875 | ,, | 115 1/4 | 110 | 110 1/2 | 5 7/16 |
| | Madras & Southern Mahratta | 3,230 | 29.12.35 | 154,575 | + 6,503 | 38 | 3,775,132 | 4,029,420 | — 254,288 | ,, | 128 1/2 | 113 7/8 | 115 1/2 | 7 1/4 |
| | Rohilkund & Kumaon | 572 | 20.12.35 | 13,679 | — 1,590 | 38 | 96,144 | 100,560 | — 4,416 | ,, | 294 | 262 | 287 1/2 | 8 9/16 |
| | South India | 2,526 | 20.12.35 | 99,943 | — 11,926 | 38 | 2,843,121 | 2,999,850 | — 156,729 | ,, | 119 3/4 | 104 1/4 | 105 1/2 | 7 1/8 |
| Various. | Beira-Umtali | 204 | Oct., 1935 | 65,747 | + 4,612 | 4 | 65,747 | 61,135 | + 4,612 | — | — | — | — | — |
| | Bilbao River & Cantabrian | 15 | Dec., 1935 | 1,516 | — 98 | 52 | 18,469 | 19,947 | — 1,478 | — | — | — | — | — |
| | Egyptian Delta | 622 | 20.12.35 | 7,946 | + 634 | 38 | 181,429 | 173,077 | + 8,352 | Prf. Sh. | 2 | 1 5/8 | 1 3/4 | 5 11/16 |
| | Great Southern of Spain | 104 | 4.1.36 | 986 | — 1,212 | 1 | 986 | 2,198 | — 1,212 | Inc. Deb. | 3 1/2 | 2 | 3 1/2 | Nil |
| | Kenya & Uganda | 1,625 | Nov., 1935 | 182,196 | + 11,855 | 48 | 2,184,339 | 2,030,213 | + 154,126 | — | — | — | — | — |
| | Manila | — | — | — | — | — | — | — | — | B. Deb. | 48 | 36 | 38 | 9 5/16 |
| | Mashonaland | 913 | Oct., 1935 | 111,983 | — 5,290 | 4 | 111,983 | 117,273 | — 5,290 | 1 Mg. Db. | 104 1/4 | 100 | 102 | 4 7/8 |
| | Midland of W. Australia | 277 | Nov., 1935 | 14,519 | — 556 | 22 | 68,781 | 71,429 | — 2,648 | Inc. Deb. | 98 3/4 | 93 | 92 1/2 | 5 1/8 |
| | Nigerian | 1,905 | 30.11.35 | 54,934 | — 7,515 | 35 | 1,055,269 | 1,151,661 | — 96,392 | — | — | — | — | — |
| | Rhodesia | 1,538 | Oct., 1935 | 202,694 | + 13,135 | 4 | 202,694 | 189,559 | + 13,135 | 4 p.c. Db. | 105 1/2 | 101 | 104 | 3 7/8 |
| | South African | 13,246 | 14.12.35 | 667,849 | + 84,374 | 37 | 20,989,783 | 18,943,473 | + 2,046,310 | — | — | — | — | — |
| | Victoria | 4,728 | Sept., 1935 | 789,350 | + 82,793 | 13 | 2,238,853 | 2,139,677 | + 99,176 | — | — | — | — | — |
| | Zafra & Huelva | 112 | Nov., 1935 | 9,907 | — 1,655 | 48 | 124,080 | 127,888 | — 3,858 | — | — | — | — | — |

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/16

† Receipts are calculated @ 1s. 6d. to the rupee. § ex dividend. Salvador and Paraguay Central receipts are in currency.

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated. The statements from July 1 onwards are based on the current rates of exchange and not on the par value